Accounting and Business Research

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Editorial

Accounting and Business Research is now in its fourth year of publication and is firmly established as a leading journal in the field of advanced accounting. More articles are submitted than can be published in the available space. Some are accepted at once; some are rejected without much hesitation; but most have to go through a process of detailed scrutiny before a decision can be made about them.

Contributions which are original and important may be accepted even if they are not particularly well written. Articles of poor intellectual quality will be rejected however elegantly they may be presented. Matters of writing and presentation may, however, be significant at the margin. Authors are therefore invited to consider the following questions.

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2. Is it necessary for you to list in your first paragraphs all the other authorities you can think of; or would you prefer your article to stand on its own merits?
3. Do you really want to refer to living authors by surname only; or would you prefer to be polite?
4. Is your mathematics really necessary?
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A Risk Analysis Approach to Profits Forecasts

A. H. Mallinson

Introduction

The objectives of this paper are to demonstrate what the author believes to be the inadequate construction and interpretation of short term company profit forecasts and to put the case for using a risk analysis approach using computer simulation and managements' subjective probability estimates. The author's criticism of what is called here 'the conventional approach' to profits forecasting arises from the common failure to recognise uncertainty or, when it is recognised, the failure to take account of it rationally.

In this paper a risk analysis approach is suggested in substitution for the conventional approach, whereby the profits forecast can be expressed in the form of a probability distribution. The case is put for including a probabilistic estimate with profits forecasts included in prospectuses so that sponsors of the issue may be able to pitch the issue price at the level which reflects a much better understanding of the likely profit outcomes of the company and prospective investors will be better equipped to evaluate the future profits. Much of the material used in this paper is drawn from research work done by the author in applying the risk analysis approach to a company profit forecast in a live situation.

The forecast compiled by the author for the subject company in the study mentioned above was produced for a 52 week period after the results of the first 26 weeks were known – a situation very similar to those where profit forecasts are published in prospectuses. It is felt by the author that the methodology adopted will be of interest to accountants, merchant bankers and brokers who are concerned with published profits forecasts and equally to directors who are responsible for preparing and publishing them.

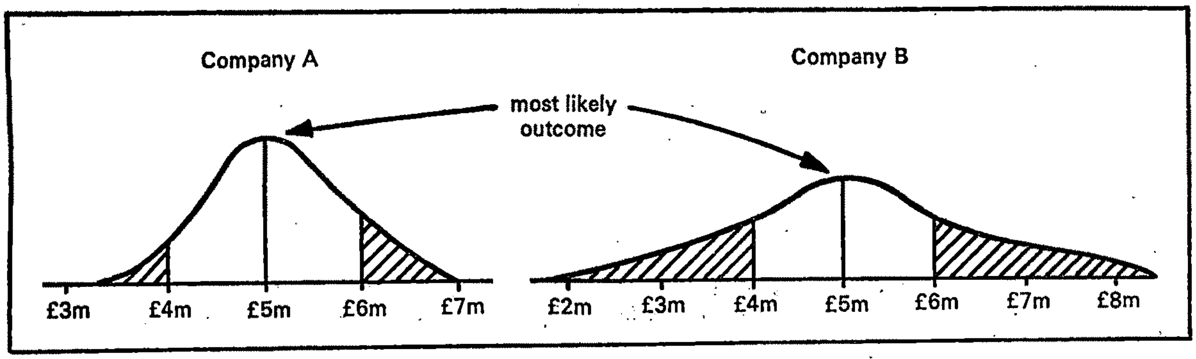
Uncertainty

The profit outcome of a one product company operating in a single market will be a function of the following major variables:

Total market
Market share
Sales price
Operating costs
Overhead cost

It may be that each of these variables could be forecast with, say, ·6 probability of being correct. However, the probability of all five outcomes being correct together is rather low at ·08 (·6 x ·6 x ·6 x ·6 x ·6). Thus the expected profit based on the expected outcomes of the five variables is based on the rather unlikely coincidence of all the forecasts being correct. Predicting a single figure most likely forecast gives a number which on its own does not tell the whole story – with an implied precision which may be misleading. What is needed to evaluate the forecast is a great deal more information about the other possible outcomes of the variables and what the firm stands to gain or lose from various combinations of possible events.

Consider the forecasts of two separate businesses of Company A and Company B. A frequency distribution of hypothetical profit outcomes is set out below:



In each case the most likely outcome is a profit of £5m. However, the probability of this most likely outcome is very different as can be seen from the relative heights of the curves at the most likely values. Consider also the probability in each case of a profit outcome less than £4m. and greater than £6m. (the hatched area under the curves). Clearly, the hatched area under the curve for Company B is very much greater than for Company A and the risk of failure of a single figure forecast of £5m. is similarly greater.

The profit forecasts of these Companies A and B might well be published in the form 'in the region of £5m.' In the absence of any previous data on the range of outcomes compared with forecasts made in the past, then on this basis the two forecasts may be ascribed an equal implied probability of being achieved. In the example this would clearly be the wrong inference to draw and yet with the absence of any indication of probability associated with the forecast we may be forgiven for drawing this inference – we lack any knowledge, from the information given, of the implications of uncertainty.

The existence and importance of large measures of uncertainty has been emphasised purposely by various interested bodies. The City Take-over Code states that 'Profit forecasts are always the results of personal judgement and are liable to be affected by a number of substantial uncertainties'.[1] The Institute of Chartered Accountants in England and Wales puts it like this: 'It is emphasised that profit forecasts necessarily depend on subjective judgements and are, to a greater or lesser extent, according to the nature of the business, subject to numerous and substantial inherent uncertainties, which increase markedly the further forward in time the forecasts stretch'.[2]

These observations show a clear understanding by these bodies of the pitfalls of forecasting. What they are not so clear about is the importance to the interpretation of forecasts of the degree of uncertainty associated with the forecast. No reference is made to probability theory and yet a forecast formulated without a clear notion of probabilities in mind is likely to be, at best, unhelpful or incapable of any assessment (even by the persons responsible for its publication) of the degree of risk associated with the forecast being achieved. The City Take-over Code Practice Note No. 6 suggests cautiously that 'It may be appropriate for maximum and minimum forecasts to be given rather than a single figure'. In the context of an intention to give helpful indications of future profit performance the author can find no circumstances in which it would be *inappropriate* to give minimum and maximum figures; if probability estimates can be given for outcomes within the range then the information supplied is further enriched.

The practical difficulties of forecasting minimum and maximum levels of profit are not materially more difficult to handle than a single figure forecast but there is a manifest unwillingness of directors to publish forecasts in this form.

A study by Dev and Webb[3] of the actual outcomes of the profits forecasts published in prospectuses in 1968 and 1969 revealed a wide variability in actual profit outcomes compared with the forecast. In the case of 1969 prospectus forecasts (but not 1968) the comparisons revealed, when expressed as a frequency distribution, a degree of symmetry either side of the mean.

This result is interesting in view of the widely propagated view that prospectus forecasts are biased on the low side. The 1968 forecasts show some indications of this bias but when the 1968–1969 data is considered as one set or the 1969 data alone the bias cannot be observed. The authors of the study concede that the findings were somewhat negative since although an estimate of the accuracy was determined, the major factors associated with forecasting errors were not revealed. The authors went on to suggest – 'It may well be that it is not possible to raise the level of accuracy of forecasts of this type above the level found in this study. If so this should be recognised by those making use of them'. The present author's view is that not only those making use of the forecasts should recognise the empirical evidence of lack of accuracy but also those responsible for publishing the forecasts. This paper describes a method which has successfully been used in a live case by which a profit forecast was compiled and presented in a range with probability estimates. Perhaps by following the suggestions made in this paper directors and issuing houses will reject the notion of a single figure profit forecast which all the empirical evidence suggests is unlikely to be accurate.

The conventional approach

A profit forecast before tax of a branch retail company issuing a prospectus may be presented to the issuing house in the following summary form:

---

[1] The City Take-over Code on Take-overs and Mergers, Practice Note No. 6.

[2] The Institute of Chartered Accountants in England and Wales Statement S15 'Accountants' Reports on Profit Forecasts'.

[3] S. Dev and M. Webb 'The Accuracy of Company Profits Forecasts'. *Journal of Business Finance*, Vol. 4, No. 3, 1972.

		(£000s)
Sales		5,000
Gross profit at 40%*		2,000
Less: Branch overheads	1,000	
Head office overheads	500	
		1,500
Profit before contingency provisions		500
Less: Contingency provision (10%)		50
Forecast profit before tax		450

*Cost of sales is imputed from the forecast gross margin.

The various components used in the construction of the forecast will be reported on by the reporting accountants and comments on the reasonableness of the major items and on the assumptions will be supplied by them to the issuing house. If the accountants have no major reservations about the bases of the forecast *per se*[4] then the issuing house will usually accept the forecast subject to the contingency provision. It is this contingency provision which ostensibly gives a prospectus forecast its bias – it will be recalled that Dev and Webb found no substantial evidence of such a bias when the actual profit outcomes were compared with prospectus forecasts. One reason to explain their findings may lie in the rationale for making contingency provision which the author believes can be muddled despite a genuine and honest attempt by those responsible to reflect caution and the perceived uncertainty.

The muddle can arise in the construction of the forecast in that different levels of probability may be used unwittingly in the various elements of the forecast. To illustrate, from the example given above, it may be that the probability of the sales forecast being achieved or bettered may be markedly lower (or higher) than the forecast of the gross profit margin which in turn may be lower (or higher) than the probability of the forecast of overhead costs being achieved. If the forecast has been constructed so that some of the elements are on a 'most likely' basis whilst other elements are 'low or high range basis' the resulting profit forecast can only be described as on a muddled basis in the context of taking an overall view of the probability of the forecast being achieved.

It appears to be a common (but not universal) behavioural trait for forecasters to prefer to make forecasts which are bettered by actual outcomes. The author has observed a tendency for those responsible for forecasting the various elements of a profits forecast to build in their own 'secret' contingency provisions often referred to as 'cushion'. In an extreme case where many or all the elements are 'low range' forecasts either deliberately or as a result of secret cushions it may be that a contingency premium is more appropriate than a discount. In any event the actual adjustment for contingencies can never be a computed figure but based only on the 'feel' of people ultimately responsible for the forecast. The author doubts whether such people can adequately compensate for muddled probability bases in the various components of the forecast.

The risk analysis approach

Before describing the application of the risk analysis approach to an actual profit forecast for a company a brief summary of the technical matters involved is made. The concept of risk analysis and its application to capital investment appraisal was pioneered by Hertz.[5] In investment appraisal the need of the decision maker is very similar to that of the profit forecaster, e.g. the 'expected value' of the return on investment or profit is required but so too are the upper and lower bounds of the possible outcomes together with their probabilities. Models for risk analysis of investment projects are therefore very similar to our profit forecasting model except that investment models move through the protracted time periods of the anticipated life of the project whereas short term profits forecast models will be concerned usually only with one time period.

There are three basic components of such a model:

Input variables
Functional relationships
Output variables

The input variables such as sales, costs, etc. are those variables which act on profit in a significant way. Models will become excessively complex if an attempt is made to handle too many input variables – without any material improvement in the result. Where input variables are uncertain (and most of the important ones will be) then their probability distributions must be specified subjectively by the managers of the business. Variables which are certain, e.g. rent, debenture interest, etc. are treated as certain. The functional relationships between the variables are established by investigation. The output variables are those variables whose probabilistic values we wish to observe, e.g. sales, costs and profits.

---

[4] Despite the fact that reporting accountants are required to report only on the accounting bases and calculations many (all?) will impute to themselves a responsibility for the assumptions and general reasonableness of the forecast even though such responsibilities were deliberately eliminated from the form of recommended report. Sooner or later, the author believes, a legal precedent will impute such responsibility to the reporting accountant as well as to the bankers.

[5] David B. Hertz 'New Power for Management', McGraw-Hill Inc., 1969.

A computer program is then written to model the three components. The values of probabilistic variables are sampled randomly from the probability distributions (the Monte Carlo technique) and this process is repeated many times simulating the real world and yielding chance values for the output variables which are accumulated and plotted out as a frequency distribution. The whole process is illustrated in simple diagrammatic form in Appendix I.

For simulation models of this kind where little benefit would accrue from a detailed and protracted investigation into the precise nature of the probability distribution of the variable, only three different types of probability distributions will probably be required. These are the uniform, normal and continuous distributions of imprecise form. All these probability distributions are represented by sub-programs of the main simulation program and make use of a pseudo-random number generator to sample randomly from the distributions. Once written these sub-programs can be repeatedly used at negligible marginal cost.

Where it is impossible to establish the precise form of distribution some close approximation will be required. For instance it will usually be possible to obtain management's subjective assessment of the value of future sales in the form of a most likely figure and an upper and lower limit. Consider the following subjective estimates of outcomes of future sales values:

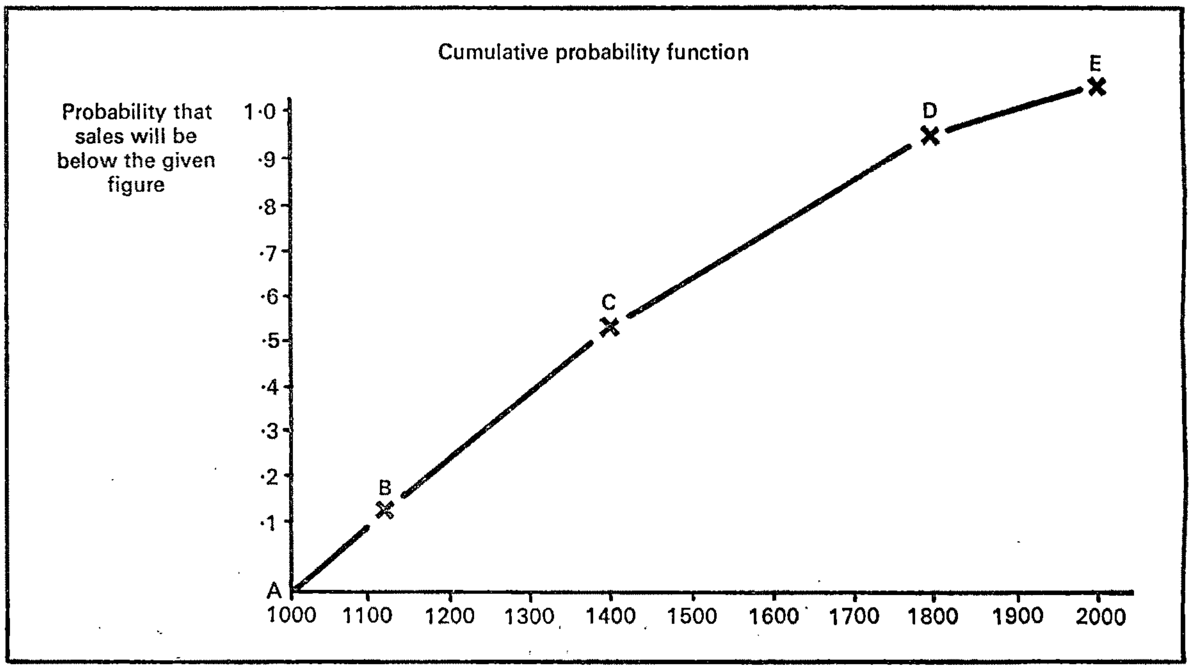
lowest value	1000
most likely	1400
highest value	2000

where the most likely value of 1400 is equally likely to be an over estimate as it is an under estimate. It is possible that the model builder, with the full co-operation of the managers of the business, could discover more details about the nature of the distribution. For instance he may be able to discover, by manipulation with betting odds, that the managers consider that there is only a 10% chance of sales falling below 1100 and only a 10% chance of being greater than 1800. However, despite further attempts the managers may be unwilling to make any closer definition of shape of the distribution.

Thus, the information which has been obtained can be summarised as follows in the form of a cumulative probability function:

	Cumulative probability
Sales will be less than 1000	·0
,, ,, ,, ,, ,, 1100	·1
,, ,, ,, ,, ,, 1400	·5
,, ,, ,, ,, ,, 1800	·9
,, ,, ,, ,, ,, 2000	1·0

This can be plotted as a cumulative distribution function.


Cumulative probability function

Sampling from a cumulative distribution function as illustrated above is achieved by first determining randomly from which interval the random variable is to be drawn. In this illustration there are four intervals, i.e. A to B, B to C, C to D and D to E. Once the interval to be sampled from has been determined any value within that interval is equally likely to be selected. In this way, the true representation of the distribution increases as the number of intervals increases. However, quite commonly the researcher will be unable to obtain further estimates from managers which will be any more reliable than the assumption made above that any figure within one interval is equally likely. It is felt that no advantage accrues, in terms of true representation by the model, by either forcing managers to make estimates they are unwilling to make or by freehand conversion of the straight line into a curve. Support is given for this conclusion by Flower in a published work showing the application of risk analysis to a costing problem.[6]

Application of the risk analysis approach

For the sake of confidentiality the name of the company which was the subject of the work done by the author together with the industry in which it operates is disguised. Suffice it to say that the company, which is referred to as 'Retail Trader', operates in a specialised sector of the retail trade through a number of branches.

The objective was to forecast the profit before tax of Retail Trader for the year ended 31st March, 1973, shortly after the expiry of the first six months of that year.

Retail Trader operates in one market only and this considerably simplified the job of model building. The major uncertainties affecting the profit outcome for 1972/73 were:

the timing of opening of new branches and their subsequent performance
the value of sales
the rate of gross profit margin
the cost of overhead charges
the value of discounts receivable.

Historically gross profit margins were found to be liable to only modest fluctuations caused chiefly by changes in the sales mix, variable experience of stock losses, improvement in margins offered by suppliers, the effect of stock holding profits following suppliers' price increases and purchase tax changes.

Only a small amount of overhead costs was found to have any kind of relationship with sales. Part of the branch wages cost is directly related to branch sales and, of course, minor items such as packing and wrapping. Many items of cost were found to be related to their cost in previous years plus inflation – in particular rent, rates and head office wages and salaries.

The approach adopted was as follows: for each variable for which a subjective estimate was required the author had discussions with either one or two managers depending on the item in question. At the end of each discussion the author was able to catalogue their estimates and probabilities. The most likely values of particular variables were asked for first – this could usually be given without too much difficulty. The upper and lower limits of the range sometimes gave more difficulty.

The output variables of the model were as follows:

Sales of new branches
Total sales (i.e. new and existing branches)
Gross profit
Total costs (i.e. all overheads less sundry receivables such as interest, discounts and rents)
Profit before tax

A simplified flowchart of the profit forecast risk analysis model for Retail Trader is set out in Appendix II. It can be seen that the model is not complex and essentially is simply a combination of various frequency distributions.

The model was run on an ICL 1901 computer using the batch processing system. For 1000 simulated trials less than one minute of central processor time was required. The use of a remote time-sharing computer and a terminal is equally possible.

The tabulations of the frequency distributions of the various output variables are reproduced as Appendices III to VII.

Interpretation of the forecast

Some method of presentation of the data given in Appendix VII must be found so that it may be readily comprehended. Set out below is a tabular version of the data shown in Appendix VII.

Possible profit outcomes	*Probability*
Between 500,000 and 520,000	·14
Between 520,000 and 550,000	·65
Between 550,000 and 560,000	·13
Between 560,000 and 590,000	·08
	1·00

It is considered helpful (to interpretation) to restrict the number of class intervals and to have a large class interval representing approximately one standard deviation either side of the most likely outcome. In this case the standard deviation is £15,800 and the most likely figure is £538,000. If the distribution was normal we would expect 68·3% of the total frequency to lie within one standard deviation of the mean. Actually the major class interval chosen is £520,000 to £550,000 and the probability of outcomes in this interval is ·65 – a result which is reasonable.

---

[6] J. F. Flower 'Accounting and Business Research', No. 4, Autumn 1971.

Although the above tabulation is possibly more readily understandable than the frequency distribution of Appendix VII it is still not crystal clear to the uninitiated – the problem appears to be that there are too many numbers to consider.

The following narrative form is suggested as the most helpful way of presenting this forecast in a prospectus:

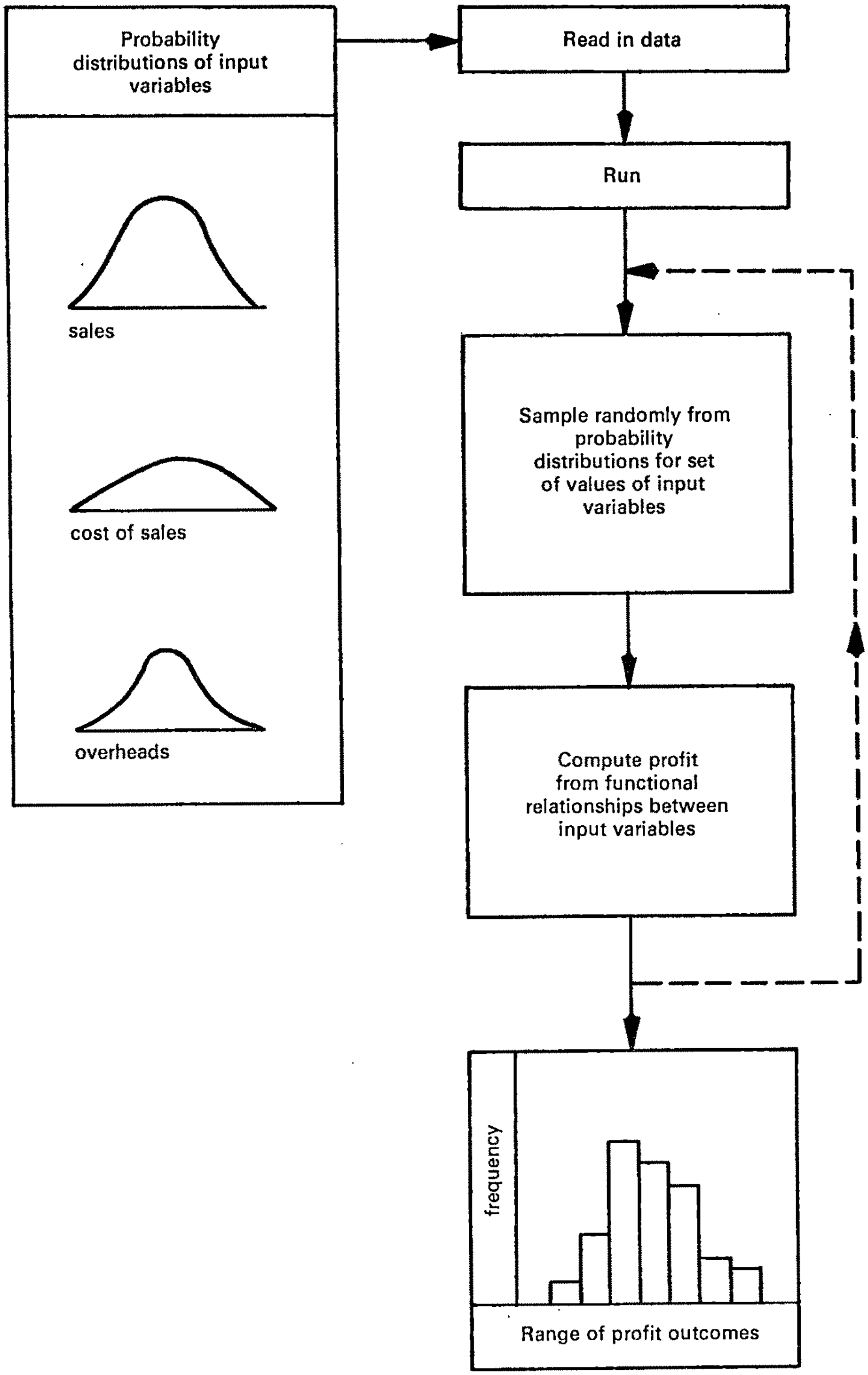
> 'The directors do not foresee the profit before tax for the year ending 31st March, 1972, rising above £590,000 or falling below £500,000. They consider that there is a 65% chance of profits falling in the range £520,000 to £550,000 and that there is a higher chance of profits being above £550,000 than of being lower than £520,000.'

When one considers the amount of information across the whole range of the distribution shown in Appendix VII and compares this with the two sentences suggested above a considerable amount of editing has been done. This does not matter. Experienced reporting accountants will recognise that frequently the fairness or clarity of what is said is often a result of what information (which is true but unhelpful) is omitted.

It will be noted that no reference has been made in the above discussion of contingencies. This is because where probability estimates are given the whole reasoning for contingency discounts disappears. If the directors wish to report a single figure forecast the reporting accountants will be able to compare this figure with the frequency distribution given in Appendix VII. For example, if the directors wished to make a forecast of not less than £560,000 it could be established from the frequency distribution that there was only a 10% chance of such a forecast being equalled or bettered. At whatever level a single figure forecast is ultimately decided on, the existence distribution will enable the degree of certainty to be (*a*) established rationally and (*b*) published along with the forecast.

APPENDIX I

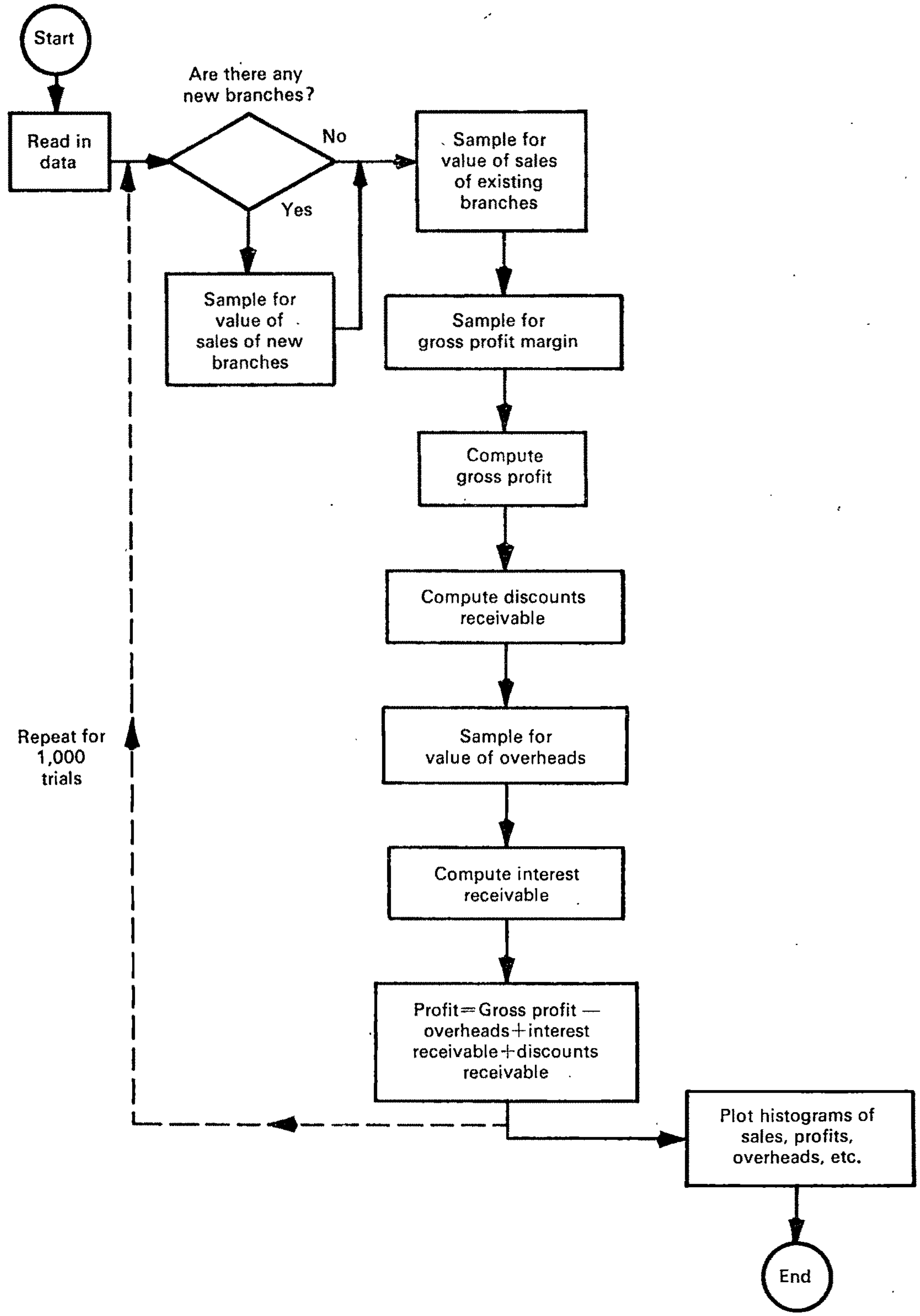
OUTLINE DIAGRAM OF THE CONCEPT OF RISK ANALYSIS APPLIED TO PROFIT FORECASTS


Probability distributions of input variables
sales
cost of sales
overheads
Read in data
Run
Sample randomly from probability distributions for set of values of input variables
Repeat for multiple trials
Compute profit from functional relationships between input variables
frequency
Range of profit outcomes

APPENDIX II

RETAIL TRADER

SIMPLIFIED FLOWCHART OF PROFIT FORECAST RISK ANALYSIS MODEL


Start
Read in data
Are there any new branches?
No
Yes
Sample for value of sales of new branches
Sample for value of sales of existing branches
Sample for gross profit margin
Compute gross profit
Compute discounts receivable
Sample for value of overheads
Compute interest receivable
Profit=Gross profit — overheads+interest receivable+discounts receivable
Repeat for 1,000 trials
Plot histograms of sales, profits, overheads, etc.
End

APPENDIX III

```
    RETAIL TRADER
                         FREQUENCY DISTRIBUTION: 1972/73 SALES BY NEW BRANCHES

VARIABLE                                PROBABILITY IN PER CENT

               5        10        15        20        25
 0.00----------I---------I---------I---------I---------I----------
     I****
     I****
 4.00-
     I***********************
     I***********************
 8.00-
     I*************************
     I*************************
12.00-
     I***************************************
     I***************************************
16.00-
     I**************************************************
     I**************************************************
20.00-
     I**************************************
     I**************************************
24.00-
     I****************
     I****************
28.00-
     I****
     I****
32.00-
     I
     I
36.00-
                    MEAN OF THE DISTRIBUTION=        16.09
                    ST.DEV.OF THE DISTRIBUTION=       6.39
```

APPENDIX IV

```
  RETAIL TRADER
                         FREQUENCY DISTRIBUTION: 1972/73 SALES


VARIABLE                           PROBABILITY IN PER CENT

                     5         10        15        20
    2630,00----------I---------I---------I---------I----------
           I*******
           I*******
    2650,00-
           I************************
           I************************
    2670,00-
           I********************************************
           I********************************************
    2690,00-
           I*******************************************
           I*******************************************
    2710,00-
           I**********************************
           I**********************************
    2730,00-
           I********************************
           I********************************
    2750,00-
           I************
           I************
    2770,00-
           I****
           I****
    2790,00-
           I
           I
    2810,00-
                         MEAN OF THE DISTRIBUTION=        2703,54
                         ST,DEV,OF THE DISTRIBUTION=        32,38
```

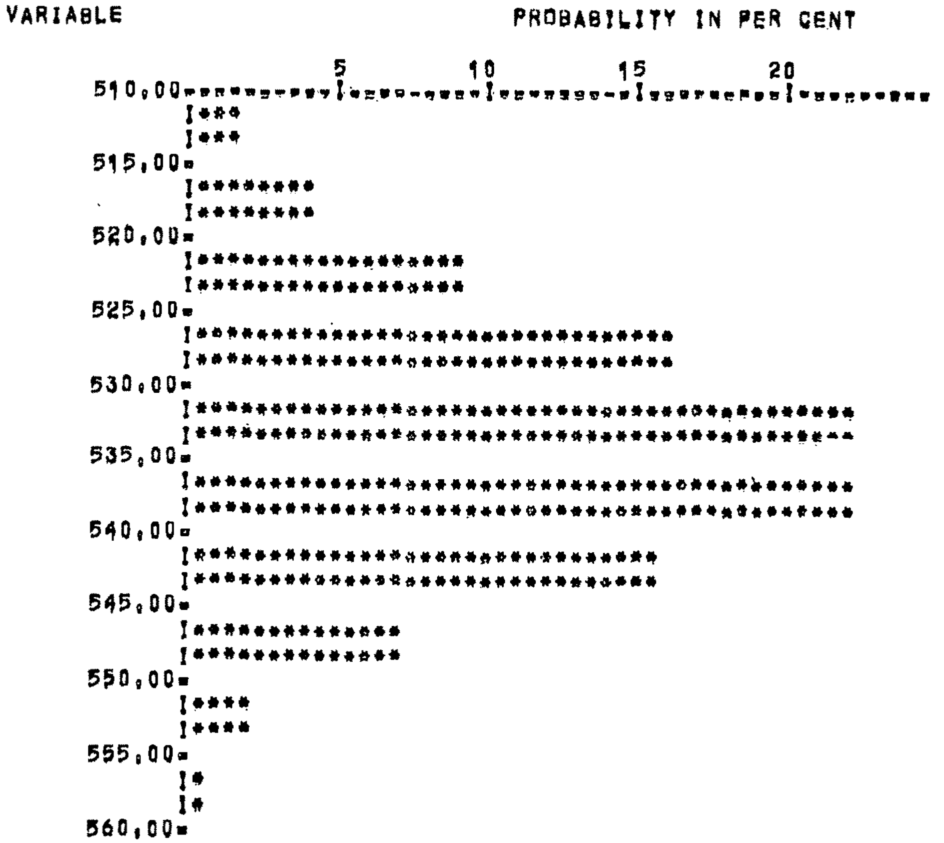
APPENDIX V

```
    RETAIL TRADER
                          FREQUENCY DISTRIBUTION! 1972/73 GROSS PROFIT


VARIABLE                             PROBABILITY IN PER CENT

                 5         10        15        20        25
1030,00---------I---------I---------I---------I---------I----------
       I
       I
1040,00-
       I*********
       I*********
1050,00-
       I******************************
       I******************************
1060,00-
       I*********************************************************
       I*********************************************************
1070,00-
       I*******************************************
       I*******************************************
1080,00-
       I**************************************
       I**************************************
1090,00-
       I*****************
       I*****************
1100,00-
       I*****
       I*****
1110,00-
       I*
       I*
1120,00-

                    MEAN OF THE DISTRIBUTION=          1072,21
                    ST,DEV,OF THE DISTRIBUTION=          13,92
```

APPENDIX VI

RETAIL TRADER

FREQUENCY DISTRIBUTION: 1972/73 TOTAL COSTS



```
MEAN OF THE DISTRIBUTION=          534,14
ST,DEV,OF THE DISTRIBUTION=          8,54
```

APPENDIX VII

```
RETAIL TRADER
                         FREQUENCY DISTRIBUTION: 1972/73 PROFIT BEFORE TAX


VARIABLE                           PROBABILITY IN PER CENT

                 5        10        15        20        25
490,00----------I---------I---------I---------I---------I---------
      I
      I
500,00=
      I*****
      I*****
510,00=
      I*******************
      I*******************
520,00=
      I*************************************
      I*************************************
530,00=
      I**************************************************
      I**************************************************
540,00=
      I*******************************************
      I*******************************************
550,00=
      I*****************************
      I*****************************
560,00=
      I***********
      I***********
570,00=
      I****
      I****
580,00=
      I**
      I**
590,00=

                    MEAN OF THE DISTRIBUTION=          538,06
                    ST,DEV,OF THE DISTRIBUTION=         15,77
```

Asset Valuation, Income Measurement and Accounting Income

G. Whittington

The recent paper by Gray and Wells[1] raises a number of important and closely related issues which the authors do not develop adequately. It is argued below, firstly, that their argument for Net Realisable Value as a method of asset valuation is over-simplified. Secondly, their argument, even if it is accepted, refers only to asset valuation and not to periodic income measurement. Thirdly, a consideration of the purposes of ex post income measurement suggests that alternative methods of financial reporting might be more relevant than the reporting of Net Realisable Value alone, as advocated by Gray and Wells. Finally, a possible reinterpretation of the purpose of traditional accounting income is suggested by the preceding arguments.

I Asset Valuation

Gray and Wells criticise Parker and Harcourt[2] for over-simplifying the valuation problem by pre-empting the 'hold' or 'sell' decision in choosing their method of valuation. However, Gray and Wells also over-simplify by continuing the pursuit of a *single* valuation. If, as they state (p. 165), reports to investors should help to determine whether maintenance of the firm's physical assets is the wisest course of action, then surely both Net Realisable Value and Present Value are relevant, even if Replacement Cost is ignored on the grounds adduced by Gray and Wells. Any *decision* as to a course of action must be based upon a comparison of values which will arise as a result of each alternative course of action, and the pursuit of a single 'correct' value of an asset is entirely misguided in this context. A single value in isolation provides no standard of comparison and therefore no means of evaluating alternative courses of action. A practical decision is likely to involve the comparison of a variety of courses of action and, therefore, of a number of alternative values.

The recording of Net Realisable Values alone pre-empts the 'sell' decision just as Replacement Cost pre-empts the 'replace' decision. In practice, liquidations are relatively rare, and Net Realisable Value is therefore unlikely to represent the return which the investor (i.e. shareholder) might expect to be realised. If one single value were to be chosen, Present Value is that which is most likely to be relevant in the typical case in which the fixed assets are retained for use in the business.[3]

This would provide a correct description of the value of the assets in the use to which they were to be put, but it would not provide a basis for a decision: an evaluation of an alternative course of action would be necessary for this.

Gray and Wells also over-simplify by refusing to recognise that, for at least one potentially important set of decisions, at least three values can be simultaneously relevant. This arises in cases of assets for which:

$PV > NRV > RC$

(Where PV = Present Value in current use, NRV = Net Realisable Value, and RC = Replacement Cost: following Parker and Harcourt and Gray and Wells, we do not assign a separate value to Present Value in an alternative use within the firm). Such a situation should lead to two simultaneous decisions for a profit-maximising firm: the asset should be sold and it should be replaced. In this case, all three values are simultaneously relevant and it is not possible to delete one valuation, leaving the resulting decision expressed in terms of only two values.

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[1] S. J. Gray and M. C. Wells, 'Asset Values and ex post Income', *Accounting and Business Research*, Number 11, Summer 1973, pp. 163–167.

[2] R. H. Parker and G. C. Harcourt, *Readings in the Concept and Measurement of Income*, (London, Cambridge University Press, 1969).

[3] The Present Value of current assets, which are held for realisation in the short term, is presumably the discounted present value of their sale price in the near future: this must be close to Net Realisable Value. There are, of course, practical difficulties in the estimation of the Present Value of assets with a longer life, but these should not be allowed to detract from the theoretical arguments for its use.

Lest it be thought that this represents an unlikely situation,[4] it is worth considering possible circumstances in which it could arise. This involves a rather careful consideration of what is meant by Replacement Cost. There are, of course, at least two concepts of Replacement Cost, the differentiation of which adds yet another possible dimension to the apparently simple analyses of Parker and Harcourt and Gray and Wells. The first is the cost of replacing the asset, and the second is the cost of replacing the service to which the asset relates. The second concept is preferred here as nearer to the economist's concept of opportunity cost: clearly, if the same service can be provided more cheaply by method B rather than method A, the profit-maximising firm will use method B and this represents the cost of replacing the service.

Having selected a definition of replacement cost, let us consider the decisions to hold, sell and replace an asset which has many uses, such as a piece of land. The growth of urban areas often means that land once suitable only for agriculture or some other relatively unprofitable (in terms of return per acre) activity develops a very profitable alternative use. Suppose, for instance, that an old warehouse or storage site becomes suitable for housing or office development. In such a case, it is quite possible that a profitable firm can justify the continued use of the land for storage purposes so that:[5]

$PV > NRV$

In such a case, although this pair of values in isolation suggests a hold decision, the addition of the relationship

$NRV > RC$

suggests a 'sell and replace' decision. Clearly, this second relationship is quite likely in the circumstances described: although it is very valuable for the firm to have *some* storage facilities, they do not have to be the *specific* ones which it holds and which have acquired development value in alternative uses.

II Income Measurement

(a) *Income for decision-making*

Implicit in the work of Parker and Harcourt and of Gray and Wells and in the whole of the DCF literature, which arose primarily out of the work of Irving Fisher, is the idea that periodic income measurement is irrelevant to decision making. Despite its appearance in the title of Gray and Wells' paper, income measurement hardly features in the discussion. Decision rules are all expressed in terms of present values at a point in time. These present values, or a sub-set of them, are somehow seen as being appropriate to the measurement of *ex post* income, but the reason for this is never discussed. Clearly, if the decision-maker has access to all the relevant present values (PV, RC, NRV), income measurement is redundant for decision-making purposes, and *ex post* income measurement can be seen merely as fulfilling some kind of narrow stewardship function, describing what has happened in the past, but bearing no relationship to present decisions. Such decisions will be a matter of disposing the resources of the entity in a manner which maximises its Present Value, which represents the discounted value of future net receipts from holding, buying or selling assets.

This interpretation of the information relevant to decision-making is very much in the spirit of Irving Fisher.[6] It will be recalled that Fisher measured capital in terms of Present Value and refused to include savings (or capital appreciation) in income, on the ground that this would involve double counting. Fisher's definition of income was therefore confined to the net receipts derived from a capital project, i.e. the stream of returns which are discounted to yield a Present Value; it did not include increments to the Present Value itself. In a world where the future is known, this is an extremely logical and entirely satisfactory position to adopt for decision-making purposes. The certain future can be collapsed into the present by the discounting process and periodic income measurement is unnecessary.

However, in practice, we do not live in a certain world, and it is not possible to provide precise details of the future cash flows which will accrue to a particular enterprise or to particular assets. A crucial component in the DCF decision rules is PV, and a precise evaluation of this is lacking once we introduce uncertainty. We therefore have to consider what information might fill the gap left by PV, or, in popular jargon, we need to find a 'surrogate' for PV.

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[4] This case is dismissed by Gray and Wells (p. 166, footnote 10) in a rather curious reference to 'market distortion': if NRV>RC is regarded as an 'unlikely market distortion', three of the six cases set out by Parker and Harcourt (p. 17) can be ignored.

[5] Here, following Parker and Harcourt and Gray and Wells, we ignore the difficulty of defining PV for a specific asset when it is part of an integrated productive unit: implicitly, we are assuming that opportunity cost is the basis of calculating PV. This is an adequate definition for the decision to hold, sell or replace *individual* assets, but in the context of valuing the firm *as a whole* it raises aggregation problems.

[6] Irving Fisher, 'Income and Capital', reprinted in Parker and Harcourt, op. cit., pp. 33–53.

Preferably, such a 'surrogate' should be less subjective than the estimate of PV: it should provide the type of information which will help the user to come to his own estimate of PV.

Possible 'surrogate' valuations which immediately spring to mind are RC and NRV. Both of these must clearly bear some relationship to PV if the acquisition and retention of assets has been decided on a profit-maximising basis. The rationale of the Parker and Harcourt, as amended by Gray and Wells, approach is that NRV must represent the minimum value of an asset to the firm if it continues to hold the asset, and RC must represent such a value in the case of replacement. However, the usefulness of this assumption depends upon the use to which the information is put. Clearly, in making the decision to hold or sell the asset, it is not very useful to assume that NRV, the 'sell' value, is also a surrogate for PV, the 'hold' value. Similarly, in making an investment decision, it is not very useful to assume that the cost (RC) is also a surrogate for value in use to the firm (PV). Equally, in appraising the effectiveness of management, the shareholder needs to know whether the management has allocated its resources in the most profitable manner: he cannot therefore *assume* that PV is at least equal to NRV in the case of assets held for use in the business, because this is to assume that management *is* efficient.

The alternative to using alternative present values such as NRV or RC as a surrogate for PV, is to provide information relevant to the estimation of future cash flows in order to enable the decision-maker to make his own estimate of Present Value. The provision to shareholders of direct estimates of future cash flows has already been advocated by Lee.[7] An alternative is the possibility that *ex post* income statements may be a guide to the future prospects of the entity: this is one of the purposes of such reporting assumed by Parker and Harcourt.[8]

(*b*) *The uses of ex post income*

We have now decided that periodic income measurement is irrelevant to decision-making, in cases where discounted present values of assets are available. In the more realistic case where present values are estimates, surrounded by uncertainty, a possible role for *ex post* income is its ability to predict the future course of events. The precise aspect of the future which we wish to predict is the net cash flow arising from the asset being valued: this is what will be discounted in order to arrive at the estimate of Present Value. Gray and Wells (p. 165) claim that Net Realisable Value *at a point in time* gives 'an indication of the means available' for future developments: on this argument, NRV may be relevant to forecasting future cash flows, although the precise connection between the two might be difficult to determine in practice. However, this is an argument for NRV as a method of valuation *at a point in time*, and we have already (but for other reasons) accepted this as one of several variables relevant to decision-making. What is less clear is that *changes* in NRV through time, i.e. periodic income measurement based on NRV valuations, will help us to predict future cash flows. A fuller discussion of this latter possibility might have added weight to Gray and Wells' advocacy of NRV as a basis for calculating *ex post* income. There may, however, be alternative methods of financial reporting which have a more direct bearing upon prediction of future cash flows, and some of these are discussed in the final section of this paper.

Before developing the argument further, we should consider possible uses of *ex post* income measurement other than decision-making. The uses listed by Gray and Wells (p. 165) include forecasting the future, planning and control, and stewardship. It seems to the present author that these functions will largely require the same information as that required for decisions, simply because most of these functions are ultimately intended to lead to decisions. Forecasting and planning will lead to the invest, hold, or sell decision in relation to assets. Control will similarly require an evaluation of alternative decisions which could have been made, in order to show whether the decisions which were actually made were good ones. Similarly, insofar as the purpose of stewardship reporting is defined, in Gray and Wells' words, as being 'to enable the owner of the property entrusted to the steward to assess the performance of the steward and check on the condition of the property', this will also involve giving similar information to that required for decisions.

The shareholder may, for example, require an estimate of the PV of the firm (or its equity), its market value (on the stock exchange), its break-up value, its value to a potential take-over bidder, or its net present value in the hands of a better management. All of these may be necessary to enable him to 'check on the condition of the property' in his company.

One exception to the conclusion that the information required for decision-making will serve for other purposes is the very narrow traditional concept of stewardship reporting for the purpose of checking the honesty of the steward. A parallel exception may arise in reporting for internal control within the entity, when it is necessary to check that certain standards have been maintained. In such cases, historic information, i.e. a precise statement of what actually happened, appears to be what is required, and historic cost becomes an appropriate basis for reporting. Current values become relevant only when we wish to check the competence, in addition to the honesty, of the steward.

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[7] T. A. Lee, 'A Case for Cash Flow Reporting', *The Journal of Business Finance*, Vol. 4, No. 2, Summer 1972, pp. 27–36.

[8] Parker and Harcourt, op. cit., pp. 4 and 5, cited by Gray and Wells, op. cit., p. 163.

III The Prediction of Cash Flows

(a) Historic cash flow reporting

Our earlier discussion has suggested that both NRV and RC are relevant information which should be included in financial reports.[9] Present Values are also relevant, but these are difficult to calculate, depending as they do on uncertain future cash flows.

One solution to the problem of financial reporting for the estimation of Present Values is the reporting of historic cash flows.[10] This could serve three purposes. Firstly, it could enable the user of the information to assess its past reliability, by comparing earlier forecasts with actual outcomes. Secondly, it could provide the base from which future projections could be made: e.g. by extrapolating trends or cycles in the historic cash flows of the firm. Thirdly, historic cash flows are objective information, appropriate to the narrow stewardship function defined earlier.[11]

The objection which is commonly made about historic cash flow reporting is that it is not possible to discern any cycles or trends because of the unevenness introduced into cash flows by large 'lumpy' items, such as the acquisition or disposal of fixed assets. Clearly, a method which enabled the smoothing out of such discontinuities might give the user of information a clearer perception of the trend of the firm's cash flow. This problem might be dealt with by segregating 'capital' cash flows from 'current' flows arising from trading activities: this is suggested, for example, by Lee. However, this is open to the objection that changes in 'current' flows are often made possible by past 'capital' flows, such as the acquisition of a capital asset. The future level of 'current' inflows may well depend upon further 'capital' outflows, when the capital asset requires replacement. It might, therefore, be misleading to report net cash inflows in isolation from the past outflows which were necessary to produce them. At this stage of our search for information appropriate to the estimation of the future cash flows of a firm, we are seeking a form of reporting of historic cash flows which smooth out short-term disturbances. This might involve adjusting periodic cash receipts for changes in short-term debtors and creditors during the period, on the ground that the latter changes do not affect the under-lying cash-generating capacity of the entity during the period. It might also involve adjusting cash outflows, so that those which were to give rise to benefits in future periods (e.g. acquisition of stocks or fixed assets) should be carried forward to the period in which their benefit on the cash inflow was felt, on the ground that such outflows were not necessary in order to produce the inflow of the current period. If we call the first type of adjustment an application of the realisation principle and the second type an application of the matching principle, we have arrived at a measure of historic cash flows which looks remarkably like traditional accounting income. Looked at as an attempt to smooth out historic cash flows, the realisation principle, the matching principle and the historic cost base all appear in a new and possibly more favourable light.

The object of this argument is not, however, to claim that traditional accounting income is an ideal type of information relative to forecasting future cash flows. It is merely to suggest a new way of interpreting traditional accounting income: as an attempt to produce a 'smoothed' historic cash flow statement rather than to measure income in the (Hicksian) economist's sense. The pioneers of double entry accounting were merchants who were accustomed to accounting for individual ventures, which would terminate and be evaluated in terms of cash yield. When this system was adapted to account for continuing businesses, some system had to be devised for allocating cash outflows to the inflows which they created, in order to give some idea of whether the business was generating a positive or a negative cash flow on its completed transactions. This need gave rise to the matching principle.

It seems quite likely that the idea of 'rate of return on net assets' and other dubious indicators of economic success being applied to historic cost accounts is a twentieth century perversion. If our view of historic cost accounting is correct then it is obviously wrong to appraise its success in terms of its ability to yield a balance sheet which contains 'economic' values such as RC or NRV, or a profit and loss account which provides a 'surrogate' for economic income. Instead, we should judge historic cost accounting by its ability to show the past cash flows of the firm in a manner which gives insights into the possible future course of such flows. It could be argued that historic cost accounts are already used in this way by investors who evaluate companies in terms of Price/Earnings Ratios.[12]

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[9] We ignore here two important problems which are worthy of much longer treatment. Firstly, there are many relevant NRV's and RC's, depending upon the variety of decisions being considered, but, on practical grounds, the number reported must be limited. Secondly, we have, throughout the discussion, ignored the aggregation problem mentioned in footnote 5 above, which is clearly relevant in valuing the whole entity.

[10] This has been advocated by G. H. Lawson, 'Cash-Flow Accounting', *The Accountant*, 28 October 1971, pp. 386–389, and T. A. Lee, op. cit.

[11] See T. A. Lee, 'Goodwill – An Example of Will-o-the-Wisp Accounting', *Accounting and Business Research*, Autumn, 1971, pp. 318–328.

The author does not believe that the traditional accounting model would emerge unscathed from such a re-examination. Matching and the realisation principle are clearly crude heuristic devices and current practice does not even apply them consistently. However, the process would perhaps lead to a better understanding of what is still the most common method of financial reporting, and it might direct attention to improvements which would help to achieve one of the fundamental purposes of financial reporting: to enable the shareholder to make an estimate of the future cash flows of the firm and therefore to estimate Present Value.

(*b*) *Forecast cash flows*

The reporting of historic cash flows, whether in unadjusted or 'smoothed' form, will be, at best, only a starting point for the prediction of future flows. Historic data have the advantage of objectivity: this is greatest in the unadjusted case. Adjustment may add to the value of the information, but the element which is added is subjective and lends itself to bias due to the bad judgement, or even the dishonesty, of the provider of information. This is true *a fortiori* of forecast cash flows, which, were it not for this defect, would be the obvious information to be supplied in financial statements. Such forecasts are already used for internal decision-making, but their provision to external users of financial statements would require an exceptional degree of competence, confidence and trust on the parts of both the users and the suppliers of information. Forecasts over the time horizon required to discount Present Value for a typical company would be subject to a large degree of error, even when they were carried out competently, and external users would have to be very discriminating in their use of such information.

A forceful case has been made by Lee[13] for the provision of predicted cash flows in financial statements, and the interested reader is referred to his work for a practical statement of how such a system might be implemented in such a way as to minimise the problems referred to above. However, it seems clear to the present author that the practicality of such a system must depend ultimately on the published predictions being more accurate than those which the information-user could derive for himself from historic data. This subject provides a rich field for research.

IV Summary and Conclusion

The main argument of this paper may be summarised as follows:

(1) *Decisions* to hold, sell or buy assets will be based upon a comparison of *values* arising from alternative courses of action. It follows that no *single* valuation of an asset is relevant to decision-making: at least two values are necessary in order to make a meaningful comparison. Many values, reflecting the range of possible decisions, may be relevant in some circumstances.

(2) *Periodic income measurement* is irrelevant to decision-making when all of the relevant values are available. However, one important value, the discounted Present Value of future receipts, is based upon estimating an uncertain future. There may be a role for *ex post* income measurement if it provides a guide to future prospects. There is little evidence that this might, in fact, be the case.

(3) *The prediction of future cash flows* is a crucial use of financial reports. The reporting of future flows predicted by the supplier of financial information might seem to be the obvious information to satisfy this need, but the high degree of subjectivity involved in prediction raises difficulties. Historic cash flow reporting is more objective, although less directly relevant.

(4) It was suggested that the *traditional accounting income* model should be interpreted not as an attempt to measure economic income, but as a form of historic cash flow reporting which attempted to smooth out the incidence of historic cash flow in such a way as to reveal more clearly any underlying trends. It was not suggested that accounting income is ideal for this purpose, or that it is necessarily very successful in achieving it. The object of the reinterpretation is to suggest that improvements in this important type of reporting should be considered from this new standpoint.

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[12] It will also be remembered that, in stock market circles, accounting income, with depreciation added back, is often described as 'cash flow'. In the light of our reinterpretation of accounting income, this description may be more accurate than might appear superficially. Similarly, the colloquial identification of 'making money' with 'making profits' may be more accurate than is commonly believed, if the profits referred to are accounting profits.

[13] T. A. Lee, 'A Case for Cash Flow Reporting', op. cit.

(5) *Conclusion:* Although this paper started as a critique of the specific work of Gray and Wells, which in turn was a critique of Parker and Harcourt, its main purpose has been to question the practice and theory of periodic income measurement. It is suggested that financial reports should provide information relevant to the assessment of the various valuations of assets in their alternative uses, including the discounted Present Values of future cash flows arising from some uses. Research should be directed towards discovering which forms of reporting will best satisfy this information requirement, rather than to the pursuit of a single 'ideal' measure of periodic income.

Determinants of Second-Hand Asset Values

Carl R. Beidleman

Introduction

With the exception of land, it is accepted accounting practice to depreciate the cost of a fixed asset over a finite period of time believed to represent its economic life. Available depreciation methods used to record the decline in asset value, despite their simplicity and objectivity, have potential limitations when applied to certain types of fabricated fixed assets in the traditional manner. Although obsolescence and wear are normally considered in the formulation of depreciation policy, serious limitations remain because the value of many fixed assets simply does not approach the predicated scrap value even over a very long duration of use. Value persists in many used assets due to their inherent non-destructibility or due to their transfer to alternative, yet profitable, uses.

The objective of this paper is to examine the relative importance of the determinants of market value of typical second-hand capital assets. The approach is to identify the theoretical determinants of second-hand values, establish a working model for testing received theory, develop appropriate asset selection criteria and data specification, and evaluate the relative importance of each determinant of second-hand value using regression methods. Research of this type is primarily investigatory in nature. It considers numerous potentially explanatory factors and seeks to exclude those that are inconsequential and identify those that are of major interest. The results have significant implications for depreciation policy formulation, capital expenditure decisions and credit allocation, as well as for sellers, buyers and dealers in second-hand assets.

Valuation Parameters

The theory of asset values serves as the basis for the empirical study. Valuation models that are employed consider both the supply and demand for second-hand assets. Looking first at demand, second-hand fixed assets such as trucks, railroad cars, and machine tools derive their value in use from the discounted present value of the net cash flows attributable to their service over the balance of their useful life. This theory has been carefully worked out by Preinreich, the Lutzes, Dean,[1] and others. Under discrete discounting at a constant rate of interest the present value theory is presented in simplified form in equation (1).

(1)

$$V = \sum_{t=1}^{n} \frac{NCF_t}{(1+i)^t} + \frac{S_n}{(1+i)_n}$$

where:

V = Value of the second-hand assset.

t = Time period under consideration $t = 1, \ldots, n$.

n = The expected economic life of the asset.

NCF_t = Net cash flow to the asset in time period t, i.e. revenue attributable to the asset less expenses of operating the asset in period t.

i = Constant rate of discount: cost of capital to the firm.

S_n = Resale (or scrap) value of the asset at time period n.

Much of the recent development in capital asset theory has been concerned with the replacement decision and attempts to determine the optimum life L for an asset. Relevant considerations include: (1) the cost function over time, i.e. the course of maintenance and operating cost, (2) the impact of technological change over time as evidenced by the expected cost saving that accrues from deferring replacement due to an expected stream of increasingly efficient assets, and (3) the rate of interest on funds committed to the replacement asset. Contributors to theory in this area are Smith, Terborgh, and Solomons.[2] Replacement theory, through its focus on the asset abandonment decision, constitutes a theory of supply of second-hand assets and discloses the theoretical factors influencing their supply. It is not essential for present purposes to delve into the underlying theoretical relationships. Identification of the variables thought to affect second-hand values is sufficient for the construction of a linear valuation model for regression studies.

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[1] Preinreich, G. A. D., 'The Economic Life of Industrial Equipment', *Econometrica*, Vol. 8, January, 1940, pp. 12–44; Lutz, F. and Lutz V., 'The Theory of the Investment of the Firm', Princeton University Press, 1951; and Dean, Joel, 'Capital Budgeting', New York, Columbia University Press, 1951.

Factors posited as affecting the demand for second-hand assets, in accordance with equation (1), include variables that reflect: (1) expected net cash flows, (2) the cost of capital funds, and (3) expected resale values. Expected net cash flows would depend, in turn, on factors such as age, operating cost, price level changes, rate of industrial production, order backlogs, and capacity utilisation. Changes in the level of discount rates or cost of capital to asset users may be monitored by yields on long-term government or industrial bonds. Expected resale values reflect abandonment alternatives and are integral with valuation factors that influence the supply of used assets.

Supply oriented factors overlap and, to some degree, are congruent with the demand factors. Supply (abandonment) factors include age, operating costs, rate of obsolescence, level of interest rates, price level indices and replacement costs. The similarity of some of the supply motivated factors with demand factors reflects interrelationships in the supply and demand for used assets. Value in use or retention value is determined by demand factors whereas the supply price (disposal value) represents minimum value in use to the firm. If market values for used equipment were to increase because of supply deficiencies, higher used asset prices would attract marginal assets away from their former applications and into the used equipment market. This process is illustrative of the Wicksteed reservation demand notion of economic theory. It also accords with the concept of functional degradation advanced by Terborgh[3] whereby used equipment is supplied to less rigorous applications as its usefulness wanes, with the degradation process continuing through increasingly less critical uses before the unit is finally relegated to the scrap yard.

Because of the interplay of demand and supply determinants, certain factors that influence second-hand values may appear as either demand or supply motivated factors depending on the specific market conditions that underlie the data sample. Moreover, a given factor may influence the demand for used assets in an opposite manner to the way in which it influences the demand for new assets. For example, higher interest rates would be expected to depress the demand for both new and used assets and hence would be expected to be negatively associated with value. But, if the need for productive assets is strong and capital is scarce or costly, less expensive used assets may become more attractive relative to new units, and used asset prices will appear positively correlated with interest rates. Interpretation of other supply and demand relationships will be more meaningful following the specification of the models, asset classes, and presentation of the regression results.

Another factor influencing market values of second-hand assets is asset condition. The condition of used assets may vary from 'as-is' (often in need of repair) to completely rebuilt and rehabilitated. Asset condition will affect both value in use and disposal value and therefore will influence second-hand transaction prices. This introduces a problem in regression analysis in that it is difficult to incorporate a qualitative factor into the analysis without seriously segmenting the data sample. This problem is aggravated by a lack of uniformity in specifying the condition of assets.

The uncertain condition of used assets is an important determinant of the rapid value run-off in the early stages of an asset's life. Because the condition of a used asset is known to the owner whereas the condition of a second-hand used asset cannot be known with certainty by a prospective buyer, buyers tend to devalue a second-hand asset. The consequence of devaluation for uncertainty is that second-hand prices will tend to be lower than value in use in a similar application.

Asset Selection Criteria

Despite a sizeable conceptual overlap with theories of the value of the firm and the value of financial assets, theories of the value of used capital assets has not been subjected to the same degree of testing that the others have enjoyed. The dearth of empirical study of the determinants of value of second-hand assets has been due largely to the inability of researchers to obtain operating costs and transaction data on the market value of homogeneous samples of used industrial assets. Collection of operating costs for assets of different ages still represents an exceedingly formidable task and is, therefore, not included in this study. However, secondary markets for used assets have developed since World War II and are now efficient enough to provide both information about pricing policies and data for regression studies. These data will be used to formulate the dependent variables in the models and permit the testing of the influence of valuation factors on second-hand values.

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[2] Smith, V. L., 'Investment and Production', Cambridge, Harvard University Press, 1961; Terborgh, G., 'Dynamic Equipment Policy', New York, McGraw-Hill, 1949; and Solomons, D., 'The Determination of Asset Values', *Journal of Business*, Vol. 35, No. 1, January 1962, pp. 28–42.

[3] Op. cit., p. 17.

In addition to the existence of second-hand markets and active trading, there are other qualifications which an asset type must possess before it can be included in a valuation study. For one thing, each asset sample must be homogeneous so that differences in asset characteristics within the sample do not bias or weaken the explanatory power of the independent variables. The price that is paid in regression studies for a heterogeneous asset class is a loss of statistical efficiency and possibly a bias in the regression coefficients.

Secondly, the asset type must have a design life, i.e. a period of production during which the equipment specification was substantially uniform, of sufficient duration to permit an active second-hand market in equipment of varying ages. Only with a 'frozen' design would it be possible to obtain transactions data at different points in time on similar assets of different age and vintage. Insufficient variability in the input data would operate in the same manner as a small sample size in weakening the statistical efficiency of the regression estimates.

Another desideratum of acceptable asset types is the need for widespread industrial usage and a relatively continuous second-hand market. Special purpose assets would not be acceptable for the study. The existence of wholesale markets to which individual dealers can turn at times of local glut or scarcity would normally ensure adequate continuity. Requirements of efficient markets including uniform information regarding asset condition and competitive values are essential in order than the observed transaction prices may accurately reflect value to the buyer. Warranty, delivery, and credit uniformity also influence the homogeneity of the sample data.

Data availability is a serious limitation to sample selection. Certain used equipment dealers were very cooperative and willing to supply the data necessary to carry out the study. Other dealers were either unwilling or unable, because of incomplete records, to provide transactions price data. Although many asset types could be considered, practical constraints limited the study to those types for which data were obtainable. Asset types that meet the above criteria and for which transactions data were accessible are:[4]

1. Railroad Freight Cars
   A. Box Cars (various manufacturers).
   B. Flat Cars (various manufacturers).
   C. Gondola Cars (various manufacturers).
   D. Hopper Cars (various manufacturers).
2. Fork Lift Trucks
   A. 2000 pound capacity (Clark Equipment Co.).
   B. 4000 pound capacity (Clark Equipment Co.).
3. Manually Operated Machine Tools
   A. Warner & Swasey – 3 turret lathe.
   B. Warner & Swasey – 3A turret lathe.
   C. Warner & Swasey – 5 turret lathe.

Valuation Models

The value of second-hand assets that is retained by the asset may be formulated in relative terms, as the proportion of the asset's original value that remains after a given length of time. Alternatively, absolute transaction values of second-hand assets are also a measure of value retained and may be used as the dependent variable in a regression model. Because price levels change with time, it is desirable that models which utilise absolute price data or relative price data whose components are recorded at different points in time have the data deflated by a relevant price index.

Dependent variables used in the valuation models are: absolute value in real terms (V_1) which uses a specific price index to deflate recorded transactions data to a constant price level; and deflated transactions data as a proportion of deflated original cost (V_2), where appropriate deflators pertain to the date of the transaction and the date of original use. Undeflated relative value using the raw transaction data divided by the original price when the asset was new (V_3) was also examined in order to evaluate the effect of ignoring changes in price levels. The dependent variables utilised in the study are specified below.

$V_1 = T_d$
$V_2 = T_d/O_d$
$V_3 = T/O$

where:

T = the recorded transaction price obtained in the second-hand market. Source: Used equipment dealers.

T_d = the transaction price obtained in the second-hand market divided by a specific price index as of the transactions date.

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[4] These data were obtained from a broad sample of used equipment dealers. Names of the cooperating dealers are withheld at the request of some dealers. A blanket acknowledgement is made to the Machinery Dealers National Association, who cooperated in this study, in lieu of recognition of the many dealers without whom the study could not have been accomplished.

·O = the original list price of the asset at the date when it was built. Source: Original equipment manufacturers.

O_d = the original list price of the asset at date built divided by a specific price index as of that date.

Specific price indices were used to deflate transactions prices and original prices for each asset type. The specific series used were:

(1) Railroad freight cars: Freight Car Index, 1913 = 100. Source: American Appraisal Co.

(2) Fork lift trucks: Construction Machinery and Equipment Index, 1957–59 = 100. Source: Bureau of Labor Statistics.

(3) Manually operated machine tools: Metalworking Machinery and Equipment Index, 1957–59 = 100. Source: Bureau of Labor Statistics.

Each of the independent variables included in the models has been selected based on received theories of asset values and is posited to have a causal influence on second-hand values. A description of the independent variables included in the study is given below.

X_1: Asset Age: While perhaps only a moderately causal factor itself due to progressive deterioration, the passage of time (asset age) acts as a surrogate for other valuation variables such as increasing operating and maintenance costs, the ongoing rate of technological improvement which makes current challenger assets more productive than their older, second-hand counterparts, and the influence of rising price levels on the cost of replacement assets. Asset age is obtained by subtracting the asset's vintage date from its second-hand transaction date. (Source: Used equipment dealers.)

X_2: The level of long-term interest rates at the time of a transaction is used as a proxy for the cost of long-term capital funds. X_2 represents the general level of interest rates as expressed in the annual return required by investors in long-term US treasury bonds. This variable abstracts from the enterprise risk and financial risk associated with each firm but retains provision for the interest-rate risk and price level risk that are inherent in the terms under which long-term capital funds are obtained to finance fixed assets. A measure of the cost of capital to user firms would be preferred to an interest rate series, but none were available because of the enormously difficult problems of identifying the costs of equity and the capital structures of the (unknown) purchaser firms of the sample assets.
(Source: Federal Reserve Bulletin – Monthly data.)

X_3: Interest rate series for specific industries were used to approximate more closely the cost of capital of purchaser firms. These series were used as alternates for X_2. The specific series for each general asset type are: (1) Railroad freight cars: Annual yield on high-grade railroad bonds. Source: Federal Reserve Bulletin. (2) Fork lift trucks and (3) Manually operated machine tools: Annual yield on high-grade industrial bonds.
(Source: Federal Reserve Bulletin.)

A number of series were employed to examine the influence of demand and supply of used assets on second-hand values. The first group focuses on the prospects for future cash flows as reflected in general and specific indices of industrial production at the transaction date. To the degree that current production influences forecasts for future output or to the degree that used assets are necessary to meet current output requirements, these series provide a meaningful measure of demand or supply of second-hand assets. Other series utilise the rate of industrial output, new orders received, industry backlogs, and the rate of capacity utilisation as surrogates for the economic benefits derived from acquiring or disposing of used assets. Attempts were also made to obtain an index of obsolescence, but available indices of obsolescence contained conceptual defects that hindered their application to a specific asset class. Moreover, if the sample asset types were truly homogeneous over their design lives, the rate of obsolescence would be zero. For these reasons obsolescence was not included as a dependent variable in this paper.

X_4: A general index of industrial production – equipment (including defense equipment). The absolute level of this index tends to rise with time as GNP and output capacity increase. This positive time trend may conceal any underlying relationship with asset values. Since we are looking for a series that reflects peaks and troughs in the demand for second-hand assets, deviations from a least-squares linear time trend were used in the study.
(Source: Federal Reserve Bulletin.)

X_5: An alternative index for X_4 consists of deviations from a linear time trend of the following *specific* production indices for the three asset classes:

(1) Freight and Passenger Equipment.
(2) Industrial Equipment.
(3) Equipment – Final Products.
(Source: Federal Reserve Bulletin.)

$X_{6,7}$: Levels of output and backlog for industries that utilise each asset type provide a measure of the production requirements being encountered by asset users and may have merit as factors that influence the course of value of used assets.

Specific series used for the three asset classes are:

X_6 (1) Freight car loadings.

X_7 (1) Ton-miles carried.

(Source: Association of American Railroads and Interstate Commerce Commission.)

X_6 (2) New orders of all manufacturers.

X_7 (2) Manufacturers' total unfilled orders.

(Source: Standard and Poors Current Basic Statistics.)

In the case of machine tools, series were available that more directly measure the demand for the asset type.

X_6 (3) Machine tools – new orders.

X_7 (3) Machine tools – estimated backlog.

(Source: National Machine Tool Builders Association.)

X_8: Wharton Index of Capacity Utilisation. This index relates total industrial production to total industrial capacity based on the trend through output peaks as a measure of potential output. The index is indicative of the amount of operating slack and thus the urgency with which used equipment is required by users.

(Source: Wharton Economic Newsletter, Univ. of Penna., Spring, 1968.)

Regression methods were employed to identify the explanatory power of each of the independent variables. The regression models consist of separate bivariate regressions of the three measures of value (dependent variables V_1, V_2, V_3) on each of the independent variables, X_1 through X_8. Multivariate models using combinations of the more highly explanatory variables where the statistical problem of multicollinearity could be minimised were then developed based on a careful study of the bivariate regression results and analysis of simple correlation coefficients among explanatory variables. A step-wise regression technique whereby each independent variable is added based on its relative ability to explain the variance in the dependent variable was also utilised in the development of the multivariate models.

Bivariate Regression Results

The bivariate regression models can be described by the following compact notation:

$$V_i = a_0 + a_j X_j \quad i = 1, \ldots, 3 \quad j = 1, \ldots, 8$$

Summary bivariate regression results covering the first two dependent variables on each of the independent variables are presented in tables 1 and 2. Regression coefficients represent estimates of the decline in value in base year dollars per unit of independent variable (X_j) for V_1 and percentage decline in value per unit of X_j for V_2. The results for $V_3 = T/O$ were inconsistent and inconclusive and have been omitted from the presentation.

With the single exception of flat cars, age is by far the most significant explanatory variable of absolute value (T_d) and relative value (T_d/O_d) of the second-hand industrial assets studied. As evidenced by the t values shown on the tables, the coefficient of age is significantly negative at the ·01 level for eight of the nine assets studied in each of the equations presented. Even the anomalous flat cars produced negative age coefficients with each model, although not statistically significant. As measured by the percentage of explained variance (R^2), the performance of age is striking in that it alone was able to explain a minimum of 36 per cent of the variability in the valuation measures. In two-thirds of the cases explained variance exceeded 60 per cent, and in two instances it exceeded 75 per cent. This salient accomplishment of age in explaining the bulk of the absolute and relative value of second-hand assets provides conclusive evidence that age serves the accountant well as a surrogate for other less manageable criteria in the formulation of depreciation policy.

The bivariate regression results also disclose the singular power of other independent variables in explaining variation in the valuation variables. Apart from flat cars and fork lift trucks, each interest rate series produced coefficients that were significantly negative at the ·05 level. This is the result to be expected in view of the inverse relationship between value and interest rates set forth in the theory of asset values. However, the explanatory power of interest rates is considerably less than age, suggesting a less influential role for them in the determination of second-hand asset values. The attractiveness of the lower cost of used assets relative to new assets when interest rates are high helps to explain the insignificance and positive coefficients of interest rates that were obtained in some cases. The peculiar influence of interest rates on the value of fork lift trucks is possibly due to somewhat limited variability in asset age at transaction dates that resulted from the short period over which transaction data were available for these assets.

The relative explanatory power of interest rates that do not reflect enterprise and financial risk (X_2) does not compare well with the R^2 obtained using interest rates that contain some premium for these risks (X_3). It appears that long-term Treasury rates consistently explain more of the variance in value and produce coefficients that are more significantly negative than their industrial bond counterparts. This result suggests that the risk premium included in industrial bond rates decreases their utility as a

TABLE 1
Bivariate Regression Results

$V_l = T_d = a_o + a_iX_i, i = 1, \ldots, 8$

	X_1 = AGE		X_2 = LTBR		X_3 = LTIBR		X_4 = PRODG		X_5 = PRODS		X_6 = DEM1		X_7 = DEM2		X_8 = CAPTY	
	a_1	R^2	a_2	R^2	a_3	R^2	a_4	R^2	a_5	R^2	a_6	R^2	a_7	R^2	a_8	R^2
	s.e.	F	s.e.	F	s.e.	F	s.e.	F	s.e.	F	s.e.	F	s.e.	F	s.e.	F
	t	d.f.	t	d.f.	t	d.f.	t	d.f.	t	d.f.	t	d.f.	t	d.f.	t	d.f.
Box cars	−14·1	·7838	−61·0	·1138	−32·61	·0838	−2·1	·1789	−1·4	·2019	−·7	·1169	−1·74	·1290	−7·22	·1809
	1·5	83·4	35·5	2·95	22·49	2·10	·9	5·01	·6	5·82	·4	3·04	·941	3·41	3·20	5·08
	−9·40	(1,23)	−1·72	(1,23)	−1·45	(1,23)	−2·33	(1,23)	−2·33	(1,23)	−1·75	(1,23)	−1·84	(1,23)	−2·26	(1,23)
Gondola cars	−12·6	·4399	−8·2	·0014	—*	—*	·8	0·144	·9	·0390	·3	·0209	−·4	·0058	1·3	·0031
	2·9	18·8	44·4	0·03	—	—	1·4	0·35	·9	0·97	·4	0·51	1·1	0·14	4·7	0·07
	−4·34	(1,24)	−0·18	(1,24)	—	—	0·57	(1,24)	1·00	(1,24)	0·75	(1,24)	−0·36	(1,24)	0·28	(1,24)
Flat cars	−1·5	·0025	11·6	·0015	−12·9	·0038	2·2	·0453	1·2	·0286	·2	·0050	2·7	·0931	10·6	·0907
	5·9	0·06	60·0	0·04	42·6	0·09	2·0	1·14	1·4	0·71	·7	0·12	1·7	2·46	6·9	2·39
	−0·25	(1,24)	0·19	(1,24)	−0·30	(1,24)	1·10	(1,24)	0·86	(1,24)	0·28	(1,24)	1·59	(1,24)	1·54	(1,24)
Hopper cars	−18·0	·6253	−59·6	·0911	−28·2	·0492	—*	—*	−·5	·0131	·5	·0652	−1·2	·0522	−3·3	·0241
	3·0	36·7	40·2	2·20	26·4	1·14	—	—	1·0	0·29	·4	1·53	1·1	1·21	4·5	0·54
	−6·00	(1,22)	−1·48	(1,22)	−1·07	(1,22)	—	—	−0·50	(1,22)	1·20	(1,22)	−1·09	(1,22)	−0·73	(1,22)
Fork lift 2000 lb.	−87·3	·5936	86·5	·0055	46·2	·0038	5·9	·0251	−5·3	·0143	7·0	·0064	4·4	·0155	6·2	·0022
	14·7	35·0	238·0	0·13	153·2	0·09	7·6	0·62	8·9	0·35	7·8	0·16	7·2	0·38	26·7	0·05
	−5·94	(1,24)	0·36	(1,24)	0·30	(1,24)	0·78	(1,24)	−0·60	(1,24)	0·39	(1,24)	0·61	(1,24)	0·23	(1,24)
Fork lift 4000 lb.	−85·8	·4330	15·3	·1016	16·6	·0707	12·8	·0719	−2·0	·0022	57·9	·1580	12·5	·0703	47·6	·0668
	17·6	23·7	328·6	3·51	206·2	2·36	8·3	2·40	7·7	0·07	24·0	5·81	8·2	2·34	32·0	2·22
	−4·88	(1,31)	1·87	(1,31)	1·54	(1,31)	1·54	(1,31)	−0·26	(1,31)	2·41	(1,31)	1·52	(1,31)	1·49	(1,31)
Lathes																
W&S 3	−183·1	·5845	−561·4	·0598	−353·8	·0485	−20·9	·0515	−28·8	·1017	−274·9	·1476	−12·5	·0964	−103·5	·0838
	23·0	63·3	331·9	2·86	233·6	2·29	13·4	2·44	12·8	5·10	98·5	7·79	5·7	4·80	51·0	4·11
	−7·96	(1,45)	−1·69	(1,45)	−1·51	(1,45)	−1·56	(1,45)	−2·25	(1,45)	−2·79	(1,45)	−2·19	(1,45)	−2·03	(1,45)
W&S 3A	−432·4	·4369	−2480·	·1755	−1373·	·0959	84·6	·1072	37·9	·0334	289·1	·0239	−3·5	·0013	320·2	·1944
	119·1	13·2	1304·	3·62	1023·	1·80	59·2	2·04	49·5	0·59	447·6	0·42	23·7	0·02	158·1	4·10
	−3·63	(1,17)	−1·90	(1,17)	−1·34	(1,17)	1·43	(1,17)	0·76	(1,17)	0·64	(1,17)	−0·15)	(1,17)	2·02	(1,17)
W&S 5	−470·8	·7577	−809·1	·0189	−671·8	·0232	−77·3	·0726	−37·4	·0347	−403·9	·0607	−12·2	·0171	−37·6	·0028
	43·2	118·8	944·7	0·73	707·1	0·90	44·8	2·98	32·0	1·37	257·8	2·45	15·0	0·66	11·4	0·11
	−10·90	(1,38)	−0·86	(1,38)	−0·95	(1,38)	−1·72	(1,38)	−1.17	(1,38)	−1·57	(1,38)	−0·81	(1,38)	−3·30	(1,38)

*The *F* value produced by this equation was less than 0·01, making it impractical to calculate the regression coefficients.

Standard errors are recorded directly below the coefficients and student *t* values are shown on the following line. The numbers below the percentage of explained variance (R^2) are the *F* values followed by the degrees of freedom of the regression.

TABLE 2

Bivariate Regression Results

$V_2 = T_d/O_d = a_o + a_iX_i, i = 1, \ldots, 8$

	$X_1 = AGE$		$X_2 = LTBR$		$X_3 = LTIBR$		$X_4 = PRODG$		$X_5 = PRODS$		$X_6 = DEM1$		$X_7 = DEM2$		$X_8 = CAPTY$	
	a_1 s.e. t	R^2 F d.f.	a_2 s.e. t	R^2 F d.f.	a_3 s.e. t	R^2 F d.f.	a_4 s.e. t	R^2 F d.f.	a_5 s.e. t	R^2 F d.f.	a_6 s.e. t	R^2 F d.f.	a_7 s.e. t	R^2 F d.f.	a_8 s.e. t	R^2 F d.f.
Box cars	−·595 ·084 −7·08	·6837 49·7 (1,23)	−2·900 ·591 −1·82	·1262 3·32 (1,23)	−1·71 1·00 −1·71	·1133 2·39 (1,23)	−·093 ·042 −2·21	·1748 4·87 (1,23)	−·063 ·027 −2·33	·1893 5·37 (1,23)	−·021 ·018 −1·17	·0537 1·30 (1,23)	−·08 ·04 −2·00	·1164 3·03 (1,23)	−·27 ·15 −1·80	·1263 3·32 (1,23)
Gondola cars	−1·007 ·132 −7·63	·7082 58·2 (1,24)	−2·717 2·756 −0·98	·0389 0·97 (1,24)	−1·719 1·902 −0·90	·0329 0·82 (1,24)	−·041 ·086 −0·48	·0094 0·23 (1,24)	−·008 ·057 −0·14	·0008 0·18 (1,24)	·015 ·026 0·58	·0125 0·30 (1,24)	−·076 ·066 −1·15	·0531 1·34 (1,24)	−·215 ·293 −0·73	·0219 0·54 (1,24)
Flat cars	−·318 ·285 −1·12	·0492 1·24 (1,24)	−2·021 2·930 −0·69	·0194 0·48 (1,24)	−2·735 2·028 −1·35	·0704 1·82 (1,24)	−·388 ·391 −0·99	·0394 0·98 (1,24)	−·020 ·072 −0·28	·0033 0·08 (1,24)	·036 ·034 1·06	·0444 1·12 (1,24)	·057 ·088 0·65	·0169 0·41 (1,24)	·205 ·352 0·58	·0140 0·34 (1,24)
Hopper cars	−1·253 ·257 −4·88	·5199 23·8 (1,22)	−8·875 2·809 −3·16	·3121 9·98 (1,22)	−4·573 1·947 −2·35	·2005 5·52 (1,22)	−·087 ·123 −0·71	·0225 0·50 (1,22)	−·060 ·081 −0·74	·0245 0·55 (1,22)	·100 ·027 3·70	·3919 14·2 (1,22)	−·130 ·088 −1·48	·0905 2·19 (1,22)	−·350 ·359 −0·97	·0415 0·95 (1,22)
Fork lift 2000 lb.	−2·506 ·429 −5·84	·5867 34·1 (1,24)	·871 6·855 0·13	·0007 0·02 (1,24)	—* — —	—* — —	·120 ·220 0·54	·0122 0·30 (1,24)	−·131 ·258 0·51	·0106 0·26 (1,24)	·116 ·515 0·22	·0021 0·05 (1,24)	·109 ·208 0·52	·0113 0·28 (1,24)	·121 ·772 0·16	·0010 0·02 (1,24)
Fork lift 4000 lb.	−1·349 ·319 −4·23	·3651 17·8 (1,31)	·10137 5·651 1·79	0·940 3·22 (1,31)	5·160 3·543 1·46	·0640 2·12 (1,31)	·212 ·142 1·49	·0670 2·22 (1,31)	−·021 ·131 −0·16	·0008 0·03 (1,31)	·975 ·413 2·36	·1524 5·57 (1,31)	·211 ·140 1·51	·0680 2·26 (1,31)	·826 ·547 1·51	·0684 2·28 (1,31)
Lathes W&S 3	−1·388 ·204 −6·80	·5068 46·2 (1,45)	−6·372 2·618 −2·43	·1163 5·92 (1,45)	−3·851 1·863 −2·07	·0868 4·27 (1,45)	−·134 ·110 −1·22	·0322 1·50 (1,45)	−·267 ·102 −2·62	·1316 6·82 (1,45)	−2·417 ·789 −3·06	·1723 9·37 (1,45)	−·132 ·045 −2·93	·1623 8·72 (1,45)	−·969 ·409 −2·37	·1108 5·61 (1,45)
W&S 3A	−2·240 ·611 −3·67	·4420 13·5 (1,17)	−15·86 6·318 −2·51	·2705 6·30 (1,17)	−9·574 ·5030 −1·90	·1757 3·62 (1,17)	·337 ·312 1·08	·0641 1·16 (1,17)	·129 ·258 0·50	·0146 0·25 (1,17)	1·484 2·306 0·64	·0238 0·41 (1,17)	−·045 ·122 −0·37	·0078 0·13 (1,17)	1·445 ·837 1·73	·1492 2·98 (1,17)
W&S 5	−3·097 ·387 −8·00	·6278 64·1 (1,38)	−4·512 6·853 −0·66	·0113 0·43 (1,38)	−2·784 5·150 −0·54	·0076 0·29 (1,38)	−·212 ·335 −0·63	·0104 0·40 (1,38)	−·195 ·233 −0·84	·0181 0·70 (1,38)	−3·057 1·857 −1·65	·0666 2·71 (1,38)	−·078 ·109 −0·72	·0135 0·52 (1,38)	—* — —	—* — —

*The F value produced by this equation was less than 0·01, making it impractical to calculate the regression coefficients.

Standard errors are recorded directly below the coefficients and student t values are shown on the following line. The numbers below the percentage of explained variance (R^2) are the F values followed by the degrees of freedom of the regression.

determinant of second-hand values as compared with that of the less risky series. It would seem, *a priori*, that the more risky series would be a better approximation of the cost of capital funds and hence a more efficient demand determinant, but evidently its greater variability due to the inclusion of a risk premium reduces the statistical efficiency of the results. Furthermore, purchasers of used assets may not be greatly influenced by the level of interest rates because many such purchasers face severe capital constraints which override the level of interest rates as a determinant of the purchase price. Treasury rates, immune from the additional noise associated with financial and operating risk premiums, contain greater explanatory and predictive power. Finally, the power of interest rates to explain value may be markedly affected by their positive correlation with aggregate economic activity (demand). This effect would counter the theoretically expected influence of the cost of funds on the value of used assets.

The remaining five independent variables studied in the bivariate models may be, alternatively, either supply factors or demand factors. The sign and significance of the regression coefficient reveal the way in which each series affects each valuation measure. In general, we would expect significantly positive regression coefficients to be associated with demand factors and significantly negative regression coefficients to be associated with supply oriented factors.

Examination of tables 1 and 2 reveals no widespread consistency in the way in which the individual explanatory variables influenced the valuation variables for each asset type. A limited number of patterns do present themselves however: (1) Of the remaining series, deviations from trend of the production indices appear to contribute most to the explanation of value. (2) Second-hand values of fork lift trucks, and more particularly the larger size trucks, appear to have more significant positive coefficients than the other asset types. This finding suggests that the independent variables used are more representative of the *demand* for lift trucks than for the other assets studied. (3) With the exception of the fork lift assets, whenever the regression coefficients are significantly different from zero (at the ·05 level), they tend to be negative indicating a supply oriented influence on asset values. Apart from two instances with hopper cars, significant positive coefficients occurred only in the case of fork lift trucks.

The results from the models that featured the undeflated ratio of transactions cost to original cost as the dependent variable, $V_3 \doteq T/O$, were inconsistent and inconclusive. In most cases the coefficient of age was significantly negative and explained variance was of the same order as the results shown. In other cases the coefficient of age was not significant at the ·05 level and in a few instances positive coefficients were produced. The problem is ascribable to the absence of proper deflation of the data to correct for rising price levels during the life of the asset. When an undeflated (T/O) is used as a valuation measure, there are two effects operating in opposite directions. One is that real (T/O) declines with age; the second is that (T) increases with time (age) during periods of rising prices while (O) is fixed. Given a rising price level, the undeflated transaction prices of older units were closer to original prices than the observed transaction prices of younger units. Hence (T/O) could be a positive function of age. It all depends on the distribution of the ages of the assets traded. Thus in certain instances the regression coefficients of age may be positive and in other cases negative or insignificant. This result points to the importance of deflation in valuation studies. As a consequence, the valuation measure, $V_3 = T/O$, was deemed not to be useful and was dropped from further study.

Multivariate Regression Results

The results presented above focus exclusively on the influence of a single explanatory variable on alternate valuation measures. Since age is so consistently dominant as an explanatory variable, it would be informative to study the incremental explanatory and predictive power of adding relevant independent variables to the bivariate model which employed age as the independent variable.

This second stage of the analysis is desirable for statistical reasons also, for if the *true* but unknown valuation model includes independent variables that are not included in the regression models, the regression results may be biased. The direction of the bias is dependent upon the signs of the correlation coefficient of the omitted variable on the dependent variable and the correlation coefficient of the omitted variable on the included variable, e.g., age. Simple correlation coefficients between age and other explanatory variables are presented in table 3. These correlation coefficients are almost all positive, hence any bias due to omitted variables will be principally in the direction of the correlation of the omitted variable on the dependent variable. In accordance with the earlier discussion of the interplay between the supply and demand orientation of the variables, this association may be direct or inverse, making it difficult to forecast the direction of the bias. Multivariate regression models should therefore be helpful in appraising the nature and severity of any bias due to omitted variables in the bivariate models, and, by implication, identify the supply or demand character of the

TABLE 3

Simple correlation coefficients between age and alternative explanatory variables

Variable	X_2	X_3	X_4	X_5	X_6	X_7	X_8
Asset							
Box cars	·335	·147	·406	·427	·311	−·177	−·094
Gondola cars	·541	·523	·430	·326	−·243	·548	·371
Flat cars	·730	·710	·558	·467	−·513	·646	·614
Hopper cars	·531	·445	·298	·463	−·111	·451	·450
Fork lift – 2000 lb.	·129	·102	·066	·217	·204	·165	·244
Fork lift – 4000 lb.	−·048	−·020	−·016	·056	−·076	·029	·012
Turret lathes							
W&S 3	·582	·554	·471	·563	·560	·537	·460
W&S 3A	·663	·591	·277	·388	·354	·529	·177
W&S 5	·472	·456	·350	·487	·550	·454	·273

independent variables.

The addition of explanatory variables to the regression models may also cause certain adverse effects. Most of the explanatory variables are dependent on time and on business conditions; hence they tend to be highly intercorrelated. This condition raises the threat of multicollinearity in the regression results and the possibility of increased standard errors. The cost of higher explained variance under such conditions is a lower degree of precision in the estimate, i.e., lower t and F values. In order to reduce the prospect of multicollinearity, those explanatory variables whose correlation with age or other included variables exceeded ·70 were excluded from the multivariate regression studies.

A second effect of adding variables to an equation that already does a commendable job of explaining the variance in the dependent variable is that the degrees of freedom of the regression are reduced, which may produce higher standard errors and lower F values. Any added variable will increase explained variance even though there is no causal relation, but the cost of increased explanatory power is often a reduction in the reliability of the coefficients as evidenced by decreased t and F values.

The multivariate regression tests were conducted within the purview of these trade-offs. The procedure followed was to select combinations of variables whose simple correlation coefficients did not exceed 0·70, and conduct extensive testing of various combinations of independent variables. The results were similar for each of the valuation measures employed. Illustrative of the results, table 4 contains summary regression statistics for $V_1 = T_d$ and two explanatory variables and table 5 presents the results for three representative explanatory variables and the same dependent variable.

As evident from the comparison of tables 4 and 5 with table 1, the addition of causal explanatory variables tends to increase moderately the t values of the age coefficients and the explanatory power of the equation as measured by R^2. F values were lower however, thus lessening the reliability of the total equation.

In almost all cases the negative age coefficients tended to be larger (negatively) when explanatory variables were added, suggesting a positive bias due to omitted variables in the bivariate models that feature age as the independent variable. Given the preponderance of positive correlation coefficients in table 3, this positive bias implies that the regression coefficient of omitted variables other than age in the true relation is positive and that the nature of their influence on value is demand motivated rather than supply motivated as suggested by the bivariate results. This finding is supported by the prevalence of positive coefficients of variables supplemental to age in the multivariate models. Furthermore, when age is not included in the valuation models, the negative bias due to its omission is so overwhelming that demand oriented factors exhibit negative coefficients and appear to be supply oriented. Then when age is included in the equation, their presence as demand variables becomes visible.

In contrast with the high level of significance of the age coefficient, only about half of the coefficients of variables other than age are marginally significant at the ·05 level. The balance are not significant. This

TABLE 4

Trivariate Regression Results

$V_l = T_d = a_o + a_l\, Age + a_iX_i,\ i = 2,5,6,7,8$

	X_2 = LTBR			X_5 = PRODS			X_6 = DEM1			X_7 = DEM2			X_8 = CAPTY		
	a_l s.e. t	a_2 s.e. t	R^2 F d.f.	a_l s.e. t	a_5 s.e. t	R^2 F d.f.	a_l s.e. t	a_6 s.e. t	R^2 F d.f.	a_l s.e. t	a_7 s.e. t	R^2 F d.f.	a_l s.e. t	a_8 s.e. t	R^2 F d.f.
Box cars	−13·9	−8·3	·7857	−13·5	−·3	·7900	−13·7	−·1	·7887	−13·98	−·09	·7841	−13·75	−·86	·7859
	1·7	18·9	40·3	1·7	·3	41·4	1·6	·2	41·0	1·71	·52	40·0	1·74	1·86	40·4
	−8·18	−0·44	(2,22)	−7·94	−1·00	(2,22)	−8·56	−0·50	(2,22)	−8·18	·17	(2·22)	−7·90	·46	(2,22)
Gondola cars	−17·2	98·8	·5854	−15·4	2·1	·6313	−12·6	−·0	·4402	−16·8	2·2	·5578	−15·0	8·0	·5453
	3·0	34·8	16·2	2·5	·6	19·7	3·0	·3	9·04	3·1	·9	14·5	2·9	3·5	13·8
	−5·73	2·84	(2,23)	−6·16	3·50	(2,23)	−4·20	−0·00	(2,23)	−5·42	2·44	(2,23)	−5·17	2·29	(2,23)
Flat cars	−4·9	47·8	·0148	−4·8	1·8	·0499	–*	–*	–*	−12·3	5·1	·1978	−11·0	18·7	·1791
	8·8	89·2	0·17	6·7	1·6	0·60	–	–	–	7·1	2·2	2·84	7·0	8·4	2·51
	−0·56	0·54	(2,23)	−0·72	1·12	(2,23)	–	–	–	−1·73	2·32	(2,23)	−1·57	2·23	(2,23)
Hopper cars	−20·89	−50·48	·6678	−21·82	−1·83	·7308	−17·69	−·10	·6259	−21·43	2·41	·6911	−21·13	6·85	·6988
	3·37	30·83	21·10	2·90	·64	28·5	3·36	·55	17·57	3·21	·97	23·49	3·06	3·03	24·34
	−6·20	−1·64	(2,21)	−7·52	−2·86	(2,21)	−5·26	−0·18	(2,21)	−6·68	2·48	(2,21)	−6·91	2·26	(2,21)
Fork lift 2000 lb.	−89·9	−206·2	·6242	−88·5	2·2	·5959	−93·0	21·7	·6523	−92·2	9·2	·6588	−94·2	3·3	·6526
	14·6	150·7	19·1	15·4	6·0	17·0	14·2	11·0	21·6	14·0	4·4	22·2	14·4	16·7	21·6
	−6·16	−1·37	(2,23)	−5·75	0·37	(2,23)	−6·55	1·97	(2,23)	−6·58	2·09	(2,23)	−6·54	0·20	(2,23)
Fork lift 4000 lb.	−84·0	555·9	·5158	–*	–*	–*	−82·3	50·9	·5543	−86·8	13·5	·5140	−86·2	49.1	·5041
	16·6	245·5	16·0	–	–	–	15·9	17·8	18·6	16·6	6·0	15·9	16·8	23·7	15·2
	−5·06	2·27	(2,30)	–	–	–	−5·18	2·86	(2,30)	−5·23	2·25	(2,30)	−5·13	2·07	(2,30)
Lathes															
W&S 3	−225·3	695·2	·6451	−205·3	14·8	·6028	−191·7	45·8	·5873	−201·1	5·6	·5984	−191·9	28·4	·5894
	26·5	253·5	40·0	27·6	10·4	33·4	28·0	83·8	31·3	27·1	4·6	32·8	26·1	38·9	31·6
	−8·50	2·74	(2,44)	−7·44	1·42	(2,44)	−6·85	0·55	(2,44)	−7·42	1·22	(2,44)	−7·35	0·73	(2,44)
W&S 3A	−447·0	199·8	·4375	−563·6	107·4	·6640	−535·2	829·9	·6095	−583·1	42·6	·5734	−498·9	418·0	·7579
	163·8	1482·	6·22	102·9	32·7	15·8	109·3	312·0	12·5	125·9	18·8	10·8	81·8	90·9	25·0
	−2·73	0·13	(2,16)	−5·48	3·28	(2,16)	−4·90	2·66	(2,16)	−4·63	2·26	(2,16)	−6·10	4·60	(2,16)
W&S 5	−560·6	2065·	·8536	−553·1	62·5	·8318	−570·4	547·6	·8355	−552·7	31·1	·8458	−500·4	140·5	·7945
	38·6	419·4	107·9	41·8	15·5	91·5	43·2	131·0	93·9	39·2	6·8	101·4	41·9	54·6	71·5
	−14·57	4·92	(2,37)	−13·23	4·03	(2,37)	−13·20	4·18	(2,37)	−14·10	4·57	(2,37)	−11·94	2·57	(2,37)

*The *F* value between the added variable and the bivariate equation was less than 0·01, making it impractical to calculate the regression coefficients.

Standard errors are recorded directly below the coefficients and student *t* values are shown on the following line. The numbers below the percentage of explained variance (R^2) are the *F* values followed by the degrees of freedom of the regression.

TABLE 5
Quadrivariate Regression Results

	$V_1 = T_d = a_0 + a_1$ Age $+ a_2$ LTBR $+ a_5$ PRODS				$V_1 = T_d = a_0 + a_1$ Age $+ a_2$ LTBR $+ a_8$ CAPTY			
	$X_2 = LTBR$		$X_5 = PRODS$		$X_2 = LTBR$		$X_8 = CAPTY$	
	a_1	a_2	a_5	R^2	a_1	a_2	a_8	R^2
	s.e.	*s.e.*	*s.e.*	*F*	*s.e.*	*s.e.*	*s.e.*	*F*
	t	*t*	*t*	*d.f.*	*t*	*t*	*t*	*d.f.*
Box cars	−13·3	29·6	−·8	·7943	−13·76	−3·77	−·56	·7860
	1·8	44·6	·8	27·0	1·79	31·27	3·07	25·71
	−7·39	0·66	−1·00	(3,21)	−7·69	−·12	−·18	(3,21)
Gondola cars	−16·0	21·4	1·7	·6337	−17·1	76·9	3·1	·5943
	3·0	56·4	1·0	12·7	3·1	47·2	4·5	10·7
	−5·33	0·38	1·70	(3,22)	−5·52	1·63	0·69	(3,22)
Flat cars	−1·5	−76·0	2·9	·0611	−4·7	−184·3	32·8	·2635
	9·4	148·6	2·8	0·48	7·8	116·1	12·0	2·62
	−0·16	−0·51	1·04	(3,22)	−0·60	−1·59	2·73	(3,22)
Hopper cars	−21·20	−30·39	2·38	·7368	−21·29	6·47	6·38	·6991
	3·08	45·14	1·04	18·66	3·30	42·80	4·42	15·49
	−6·88	−0·67	2·29	(3,20)	−6·45	0·15	1·44	(3,20)
Fork lift 2000 lb.	−91·8	216·2	3·2	·6291	−95·2	−121·7	44·6	·6557
	15·3	154·2	5·9	12·4	14·8	274·1	31·4	14·0
	−6·00	1·40	0·54	(3,22)	−6·43	−0·44	1·42	(3,22)
Fork lift 4000 lb.	−84·7	735·1	7·8	·5405	−84·7	382·6	24·1	·5248
	16·4	282·4	6·3	11·4	16·7	340·2	32·5	10·7
	−5·16	2·60	1·24	(3,29)	−5·07	1·12	0·74	(3,29)
Lathes								
W&S 3	−224·2	728·8	−2·2	·6454	−222·7	781·3	−25·4	·6482
	27·6	320·7	12·4	26·1	27·0	291·6	41·6	26·4
	−8·12	2·27	−0·18	(3,43)	−8·25	2·68	−0·61	(3,43)
W&S 3A	−438·0	−2256·	139·6	·7250	−388·2	−1631·	471·3	·7950
	118·3	1237·	35·3	13·2	102·8	991·1	92·5	19·4
	−3·70	−1·82	3·95	(3,15)	−3·78	−1·65	5·10	(3,15)
W&S 5	−571·1	1560·	24·7	·8595	−562·5	1860·	51·8	·8577
	39·3	586·0	20·2	73·4	38·6	465·3	51·1	72·3
	−14·53	2·66	1·22	(3,36)	−14·57	4·00	1·01	(3,36)

Regression coefficients are estimates of the change in asset value in base year dollars per unit of independent variable.

mediocre performance of variables other than age supports the position of age as the outstanding explanatory variable of second-hand values. The conclusion is clearcut; while additional variables supplement slightly the explanatory power of age and remove some bias due to omitted variables, the inclusion of age alone in a valuation model is sufficient to obtain significant explanatory and predictive power. Moreover, the addition of age to a model that did not formerly include it removes the large bias due to its omission and allows the explanatory variables to display their true roles as determinants of value. The results of regression models using three explanatory variables presented on table 5 also lead to the same conclusion.

Accounting Significance of the Results

The results of this research have important implications for accountants concerned with the formulation of depreciation policy. The paramount conclusion from the regression results is that age is clearly the most powerful determinant of the value of the used industrial assets included in the study. Age itself may be expected to serve as proxy for increasing operating cost and increasing inferiority in comparison with replacement assets. Moreover age is highly positively correlated with many other explanatory variables, making it the most likely surrogate for use in a valuation model.

In general, no other variable studied approached age in its ability to explain value run-off. And the addition of other variables to the valuation model adds little to the power of age alone in explaining the value of used assets and may detract from the reliability of the age coefficient. Hence age justifies the role usually given it by accountants as the *sole* determinant of the reduction in asset value in the formulation of depreciation policy.

This confirmation of traditional accounting practice is a welcome addition to the bulwark defending accepted accounting principles. It should not be forgotten, however, that the models on which this conclusion is based take account of changes in price levels, whereas less meaningful and inconclusive results were obtained from models that did not provide for changing price levels. The need to incorporate the effect of changing price levels into fixed asset valuation policies is not relaxed by the findings of the study. The impact of rising prices lessens the power of age alone to predict the run-off in asset value and should be considered explicitly by accountants in the formulation of fixed asset valuation policy.

The regression results are also relevant to the matter of the specific depreciation method or formula used to value fixed assets. Although asset age is the dominant factor in explaining used equipment values, the relationship is not linear throughout. The size of the regression constants and the regression coefficients of age suggest a rapid run-off in value in the initial few years, a more gentle decline thereafter, and an ultimate resale or scrap value considerably greater than zero for very old assets of the types studied. Table 6 contains regression statistics and implied asset lives based on the model that uses $V_2 = T_d/O_d$ as the dependent variable. The regression constant (a_0) represents an estimate of used asset value at age zero based on the rate of decline in value of the assets included in the data sample. Apart from the W&S 5 turret lathe which is the ever present exception that, although annoying to the researcher, belies manipulation of the data, these data show a very sizeable, immediate run-off in value.[5] Thereafter, a gradual decline is depicted by the regression results. The point of zero value is obtained by the division of age coefficient into the regression constant. Line VV_1 on Chart 1 illustrates this decline in value for Warner and Swasey 3 turret lathes.

Although such an interpretation of the regression results is tempting, it should not be made without consideration of the underlying statistical implications. First, the least squares regression methods

TABLE 6
Decline in real value of used assets

$T_d/O_d = a_0 + a_1$ Age

	(1) Regression Constant (% of O_d)	(2) Age Coefficient (% per year)	(3)=(1)÷(2) Implied Life (years)	(4) Average age of Sample Assets (years)	(5) Range of Asset Age (years)
Box cars	27·8	−0·60	46	25·4	21–36
Gondola cars	39·6	−1·01	39	22·3	6–32
Flat cars	24·7	−0·32	77	20·0	9–31
Hopper cars	44·7	−1·25	36	25·4	16–37
Fork lift–2000 lb.	80·8	−2·51	32	6·4	1–22
Fork lift–4000 lb.	63·2	−1·35	47	7·4	3–16
Turret lathes					
W&S 3	62·6	−1·39	45	20·3	8–30
W&S 3A	73·8	−2·24	33	20·8	12–31
W&S 5	105·6	−3·10	34	18·6	4–27

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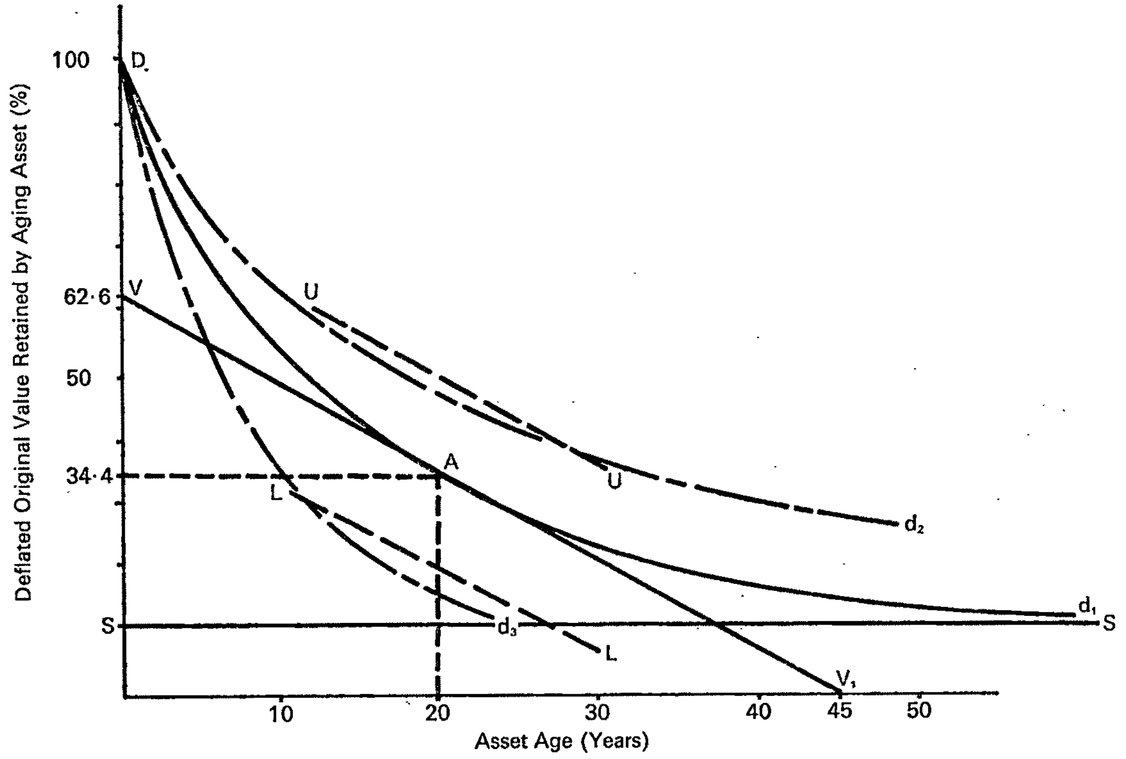
[5] An opposite view could also be taken with regard to the regression constant for the W&S 5 turret lathe sample. Since it is the only asset sample that produced a regression constant near the actual figure at zero age (100%), perhaps it should be given a place of honor. However, because it is out of line with all of the other results and with *a priori* notions of rapid initial run-off in value, the proximity to 100% is more of a statistical artifact than a confirmation of a linear relationship between age and value beyond the range of the data.

Chart 1 Decline in Real Value Warner & Swasey 3 Turret Lathes



employed forced a straight line fit to the observed data. The results contained in table 6 indicate that the samples consisted of middle-aged assets where the annual decline in value would be expected to be approximately linear regardless of the nature of the value function. The use of middle-aged assets to calculate regression estimates does, however, cause difficulty in extrapolating the estimates beyond the range of the data. In particular, the zero age intercept on the value axis represents an error due to extrapolation since we know the transaction value at time zero was equal to its original value. The devaluation for uncertainty associated with used assets takes some measurable time to operate. Loss of original value due to this cause undoubtedly accounts for a decline in value although it may take a few years until the level suggested by the regression constant is reached. This is illustrated by segment DA on Chart 1.

Similarly, extrapolation of the regression line beyond the upper range of the data may result in an understatement of value for property maintained, durable industrial assets. The prospects of functional degradation and periodic overhaul often extend asset lives to very old ages. Examples can be cited of used lathes and other equipment passing through the second-hand market at ages of fifty years or more. Hence the true relationship between age and asset value does not remain linear in the upper reaches of age but becomes asymptotic to some minimum value in scrap at very long lives, as illustrated by Ad_1 and SS on Chart 1.

A second qualification is necessary in the interpretation of the regression estimates. The derivation of implicit asset lives in table 6 was obtained by the division of an estimate from a probability distribution of regression constants by an estimate from a probability distribution of regression coefficients of age. The components of this ratio are not independent,[6] therefore their quotient is not single valued; rather it is just one observation from a probability distribution of possible asset lives. Hence there are a range of possible asset lives and a corresponding range of declining asset values.

The range of value run-off can be approximated within the range of the data by a confidence interval calculated by the use of the regression standard error. The 95% confidence interval for W&S 3 turret lathes is shown on the chart as the area between curves UU and LL. Confidence intervals calculated from the regression standard error should not be extended far beyond the range of the observed data. However, guided by the confidence interval within the range of the data, curves Dd_2 and Dd_3 on Chart 1 illustrate the range of value decline that might be expected for turret lathes.

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[6] Actually they are negatively correlated, see Johnston, J., 'Econometric Methods', New York, McGraw-Hill, 1960, p. 16.

Concluding Remarks

Asset valuation policy decisions must continue to be made based on estimates of possible lives and the nature of the decline in value during the life selected. The findings of this study provide extensive evidence regarding the predominant role of age in the determination of value of certain fixed assets and the relative unimportance of valuation parameters other than age. The initial rapid decline in second-hand values calculated by the regression models supports the use of accelerated depreciation techniques and the approach to finite scrap value favors declining balance methods of depreciation. Evidence of a gradual decline in real value of middle-aged assets obtained by the study should be helpful to those who find it necessary to estimate fixed asset values: capital budgeters, lenders, asset disposition departments of industrial firms and governments, and purchasers and dealers of used equipment.

The results of the study should help to increase the willingness to forecast longer useful lives of industrial fixed assets and may influence future depreciation lives. Concern over uncertainty of future product demand, and uncertainty of future service lives, should be lessened by this increased knowledge of the way in which second-hand values are determined. The efficiency with which capital is allocated to new investment projects can be increased with the help of more reliable value data covering the abandonment alternative of representative industrial assets. And the range of possible asset lives endorses the need for probability life depreciation.[7] Finally, recognition of longer service lives or of higher abandonment values should enable the accountant to improve the precision of financial statements in the very difficult area of allocating fixed asset costs to income periods.

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[7] For recent discussions of multiple possible asset lives and their effect on depreciation allowances, see Ijiri, Y., and Kaplan, R. S., 'Probabilistic Depreciation and its Implications for Group Depreciation', *Accounting Review*, Vol. XLIV, No. 4, Oct., 1969, pp. 743–756; and Jen, F. C. and Huefner, R. J., 'Depreciation by Probability Life', *Accounting Review*, Vol. XLV, No. 2, April, 1970, pp. 290–298.

Some Difficulties Facing Organisers of Interfirm Comparison Schemes

John Sizer

Introduction

The senior management of a company may wish to compare its financial performance roughly or in detail with that of its competitors. A comparison with the financial performance of individual companies or with industry averages may be required. Comparisons with financial accounts of individual companies drawn from the files of the Registrar of Companies normally are of limited value for this purpose. As there are a number of permitted accounting rules for dealing with items of revenue, expenditure, assets and liabilities, and no two companies employ exactly the same set of accounting rules, the rates of return on capital employed of any two companies may not be intrinsically comparable. There are other problems, such as the effects of inflation, which most accountants are familiar with. Even if it were possible to compare directly with published sources, a comparison of return on capital employed does not itself tell the management any more than that in a particular year the firm's ratio was higher or lower than that of firm A, B or C. It does not tell the management *why* the ratios of the firm differ. If it is to provide a basis for judgement, an external comparison should be planned in such a way that management is provided with the detailed ratios in the lower part of the pyramid of ratios that can be derived from return on capital employed. Much of the information required to calculate these detailed ratios is not available in the files of the Registrar of Companies.

A more valuable and meaningful method for a company to compare its performance with individual competitors may be to participate in an interfirm comparison scheme. Participating firms receive anonymous and absolutely confidential comparisons of selected ratios. There are over seventy industries and trades in Britain which have had interfirm comparisons prepared or conducted by the Centre for Interfirm Comparison, and a number of trade associations, such as the British Federation of Master Printers, organise their own schemes. The pyramid of control ratios provides the basis for the majority of schemes, but some schemes, including the one referred to in this paper, are concerned with the analysis of product costs and profitability.

In the operation of such interfirm comparison schemes it is extremely important that the figures for all the firms in a comparison are calculated on the basis of the same definitions and valuation principles. To obtain accurate and meaningful interfirm comparisons it is necessary for a central organisation, such as the Centre for Interfirm Comparison or a trade association to:

(a) establish detailed definitions and principles of valuation;
(b) agree with each participating company the methods for following them;
(c) collect and check the actual figures;
(d) calculate, tabulate and circulate ratios for the participating firms;
(e) assist the management of the participating firms to interpret the ratios; and
(f) undertake a continuous programme of development of improved comparisons and education in the use of interfirm comparisons.

For example, the Centre for Interfirm Comparison provide participating firms with simple but detailed definitions of terms and instructions on asset values. In particular, they show firms how, by using a price index, they can arrive at comparable current values of plant and machinery. Once the information has been collected, the Centre apply a number of checks: arithmetic, internal consistency against annual accounts, inherent probability, and consistency with previous year's figures. The control ratios for each firm are then calculated, and any ratios that differ substantially from those of other firms are queried. The ratios are tabulated and circulated to the participating firms, each firm being given a code number. The data appear in ratio, percentage and similar statistical form (rather than absolute figures) which further reduces the possibility of identification. Each participating firm also receives the Centre's observations on their ratios to help them in interpreting the differences between its ratios and those of others in the comparison. These observations are made in the light of background information relating to the operating conditions of the industry and the firms in question.

It is important to appreciate that it is *not* the object of interfirm comparisons to arrive at general conclusions about the industry to which a comparison relates. The aim is to provide the top management of each participating firm with a diagnostic tool which may highlight undetected weaknesses in the firm's operating policy and performance. The Centre's confidential reports are designed to show the firm how well their overall performance compares with other participants', and possibly *why* it differs. The less efficient the firm the more it stands to gain from participating in an interfirm comparison scheme. However, the more efficient firms should derive some useful information from the comparison.

Having participated in an interfirm comparison scheme it is important that management fully utilise the information. Fred Catherwood, when Director General of the National Economic Development Office, pointed out, 'It is odd that some firms will spend thousands of pounds on a consultant's report and go through it with a fine tooth comb, especially the technical and production matter, but the same firm will sometimes disregard an interfirm comparison that has cost them thirty guineas.'[1] In some schemes the participants do not automatically receive observations on their ratios. In these cases it is important that the company accountant not only understands the relationship between the ratios, but also explains the relationship to management. He should also prepare a detailed interpretation of the ratios. The author is familiar with a case similar to that suggested by Fred Catherwood. The interfirm comparison prepared by a trade association was disregarded because the directors neither understood the relationship between the ratios nor received any meaningful interpretation of the ratios. The accountant did not really understand the relationship between the ratios himself, and he never explained to the directors the pyramid of ratios. He merely circulated the ratios with short cryptic comments alongside each ratio.

It should not be assumed that interfirm comparison schemes overcome all the weaknesses of direct external comparisons. The uniform definitions and valuation problems may not, for example, overcome the *transfer price* problems if a participating company is a member of a vertically integrated group of companies, nor the problems of the company accepting an export order which is profitable for the group of companies but not for the company itself. No two companies are strictly comparable in that they market exactly the same products for the same markets. Other difficulties have been examined recently by Higgins and Jackson.[2] A scheme should provide a more realistic starting point in the analysis of a company's past performance relative to that of its competitors than direct external comparisons with published accounts. Even after detailed analysis of the interfirm comparison data further studies will often be required before recommendations for improving performance can be made. The interfirm comparison should enable the management to determine *where* and possibly *why* its performance was better or worse than that of its competitors but it will not necessarily tell it *how* to improve it.

The author examined an interfirm comparison scheme operated by a trade association. The scheme presented an analysis by product group of sales, cost and profits per thousand units sold. In the case of a multi-product firm, the company's profit and loss account was analysed by product groups. The comparison covered six product groups, the groups being classified by method of production. In order to preserve confidentiality these will be referred to as Product Groups A to F. The study highlighted some of the difficulties faced by organisations operating interfirm comparison schemes and, in particular, why these difficulties may be more acute when schemes are operated by trade associations.

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[1] The Centre for Interfirm Comparison's fee per participating company per annual comparison ranges (in 1973) from £150 to £600 depending on the amount of detail provided, whether it is a U.K. or international comparison project, and on whether and how often participants are visited.

[2] J. C. Higgins, and K. C. Jackson, 'Essential criteria for valid interfirm comparisons', *Management Accounting*, Vol. 51, No. 6, June 1973, pp. 247–250.

Participation in the Scheme

For an interfirm comparison scheme to achieve its objectives, there must be a sufficient and representative number of firms participating to allow valid comparisons to be made. If a firm appears efficient in a comparison which includes only a small number of firms, it could develop a false sense of security if its most efficient competitors do not participate in the scheme. If the level of participation in a scheme is low and the drop out rate high, its value is questionable. The mix of firms participating may be changing from year to year, and those firms who participate regularly may not be able to make a valid comparison over a number of years of their performance relative to other firms. A downward participation spiral could develop, firms withdrawing because they consider that an insufficient number of firms are participating, and consequently making the scheme less attractive to the remaining participants and to possible new participants. Furthermore, a low and declining level of participation will seriously affect the financial viability of a scheme.

The number of firms that participated over a ten year period in the scheme examined is shown in Table A, and the number of product group entries in Table B. While the total number of firms participating in any one year did not vary significantly over the ten year period, it will be noted that a high percentage of firms dropped out each year. The percentage drop outs ranged from 22% in Year 9 to 38% in Year 5. 199 firms participated in the scheme during the ten year period. An average of 12·6% of the trade association's membership participated during any one year. 34·8% of the average membership over the ten year period participated at least once in the comparison during the period. Table C is an analysis of the number of occasions each of the 199 firms participated during the ten year period. It will be noted that 28·6% of the firms participated for one year only, that 35·8% of the 134 firms that withdrew from the scheme during the period participated once only, and 74·6% of the firms that dropped out participated for three or less years. On the other hand, of the 65 firms that participated in Year 10, a hard core of firms participated regularly over the period. 61·5% of the Year 10 participants had done so for 5 or more of the last ten years.

While 134 firms took part and dropped out of the scheme over the ten year period, the total drop outs over the period in Table A is 203 firms. This difference arose because some firms withdrew from the scheme and returned at a later date. Table D is an analysis of the 203 drop out firms. Some firms followed a deliberate policy of taking part in the scheme once every two or three years. Other firms withdrew because they were undergoing a major change in their product mix, production methods, organisation structure, etc., and returned, or planned to return, at a later date.

TABLE A
Firms participating in the scheme

	Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*Year 6*	*Year 7*	*Year 8*	*Year 9*	*Year 10*
End of previous year	NA	55	62	68	76	77	79	83	72	73
Drop outs	NA	16	15	22	29	21	19	30	16	26
	NA	39	47	46	47	56	60	53	56	47
Additions	NA	23	21	30	30	23	23	19	17	18
	55	62	68	76	77	79	83	72	73	65
Drop outs as % of previous year total	NA	29%	24%	32%	38%	27%	24%	36%	22%	36%
Trade Association membership	627	618	603	589	572	564	566	549	534	501
% of membership participating in scheme	9%	10%	11%	13%	13%	14%	15%	13%	15%	13%

TABLE B
Product group entries

Product Group	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
A	20	20	23	29	30	34	33	26	27	21
B	24	22	23	22	20	19	17	12	12	9
C	26	27	24	23	18	19	19	18	20	20
D	–	–	–	17	18	15	22	24	20	20
E	18	17	20	28	21	21	21	22	24	21
F	–	12	25	22	28	28	27	25	20	15
	88	98	115	141	135	136	139	127	124	106

TABLE C
Firm participation over ten year period

	Total		Year 10 participants		Drop outs during ten year period	
Number of years	Number of firms	%	Number of of firms	%	Number of firms	%
1	57	28·6	9	13·8	48	35·8
2	36	18·1	7	10·8	29	21·6
3	27	13·6	4	6·2	23	17·2
4	17	8·5	5	7·7	12	9·0
5	15	7·5	8	12·3	7	5·2
6	13	6·6	6	9·2	7	5·2
7	9	4·5	5	7·7	4	3·0
8	6	3·0	5	7·7	1	0·7
9	13	6·6	10	15·4	3	2·3
10	6	3·0	6	9·2	–	–
	199	100·0%	65	100·0%	134	100·0%

TABLE D
Analysis of drop outs

	Year 10 participants	*Total*
20	dropped out once and returned	20
4	dropped out twice and returned	8
1	dropped out three times and returned	3
25		31
	Drop outs during ten year period	
102	participated once and dropped out	102
27	participated twice and dropped out	54
4	participated three times and dropped out	12
1	participated four times and dropped out	4
199		172
	Total drop outs during ten year period	203

While the number of firms participating may indicate the degree of support from trade association members for the scheme, it is not an adequate measure of the economic importance of the scheme. A more meaningful measure of the economic importance of the scheme might be the size of the firms participating in relation to the total size of the industry. This could be measured in terms of total assets employed, value added, turnover, or number of employees. Some information was available on number of employees. Of the 498 firms in the trade association's list of members for Year 10/11, the number of employees as at May, Year 10 was available for 464 firms. This information is analysed in Table E. It will be noted that 60% of the member firms had less than 100 employees, and 43·5% of the employees were employed by 6% of the firms. The average number of employees per member firm was 208, and this suggested that the 498 members of the trade association had approximately 98,000 employees. Over 800 firms with 118,000 employees were registered with the industry's Training Board. Therefore, approximately 60% of the firms registered with the Training Board belonged to the Trade Association, but the trade association membership covered some 83% of the industry's employees.

TABLE E
Analysis of trade association membership by employees

Range	*Number of firms*	*% of total*	*Cumulative percentage*	*Number of employees*	*% of total*	*Cumulative percentage*
1–25	70	15·1	100·0	1,190	1·2	100·0
26–50	92	19·8	84·9	3,432	3·6	98·8
51–100	115	24·8	65·1	8,558	8·9	95·2
101–200	80	17·2	40·3	11,730	12·2	86·3
201–500	60	13·0	23·1	18,025	18·7	74·1
501–750	19	4·1	10·1	11,437	11·9	55·4
751–1,000	10	2·2	6·0	8,793	9·1	43·5
1,001–2,000	14	3·0	3·8	18,490	19·2	34·4
2,001–4,000	2	0·4	0·8	4,166	4·3	15·2
4,001+	2	0·4	0·4	10,479	10·9	10·9
Sub total	464	100·0		96,300	100·0	
Not available	34			1,700 (Estimated)		
TOTAL	498			99,000 (Estimated)		

TABLE F
Analysis of participants by employees

	Number of firms		
Range	Trade association membership	Participants in interfirm comparison	%
1-25	70	–	NIL
26-50	92	9	10
51-100	115	13	11
101-200	80	18	23
201-500	60	13	22
501-750	19	7	27
751-1,000	10	2	20
1,001-2,000	14	3	20
2,001-4,000	2	–	NIL
4,000+	2	–	NIL
	464	65	
NA	34	–	
	498	65	

An analysis by number of employees of firms that participated in the interfirm comparison in Year 10 is provided in Table F. It will be noted that, while 13% of the trade association's membership and approximately 8% of the firms registered with the Training Board participated in the scheme in Year 10, the participants represented 18% of the total employees of the trade association's membership, and 15% of the total registered with the Training Board. It can be argued that the interfirm comparison scheme had greater economic significance than the percentage firm participation in terms of trade association membership indicated.

How does the level of participation in the scheme under consideration compare with that in other interfirm comparison schemes? There is only a limited amount of information available. A survey undertaken in 1963 by the Centre for Interfirm Comparison of schemes operated by trade associations indicated a weighted average participation of 5·5% of possible firm membership with a range of 1·5% to 72%. The Centre for Interfirm Comparison indicated at the time of the study that a 10% firm participation is quite reasonable. Higgins and Jackson refer to 'reports that the CIFC considers a 15% sample to be about the maximum achievable'.[3] The Centre did point out that large firms tend to participate in their schemes, and the participants frequently represented between 40% and 60% of industry turnover. They did not collect detailed statistics on drop out rates but suggested a 10% norm though it could be higher.

A major part of the author's study was concerned with future participation of firms in the scheme. In particular, three sets of questions were considered:

(a) Why was it that so many firms dropped out of the scheme after participating for one, two or three years? Could these firms be attracted back into the scheme?

(b) Would the decline in participation between Years 9 and 10 continue? How many firms that participated by Year 10 intended to remain in the scheme?

(c) Could firms that had not participated in the scheme be attracted into the scheme? Why had these firms not participated?

Views of the scheme were obtained from managing directors and/or financial directors of 73 firms. Most directors were interviewed but written comments were received from some and telephone conversations held with others. Directors of four firms refused to be interviewed but did state their views on interfirm comparison schemes. Table G is an analysis of the 73 firms by type of contact and relationship with the interfirm comparison scheme. Many of the views expressed related specifically to the operation of the scheme under examination, but others highlighted some of the difficulties which have to be faced by organisations operating interfirm comparison schemes, particularly trade associations. These latter views are reported in this paper.

Reasons Why Past Participants Withdrew

There was rarely a single reason why the 35 past participants withdrew from the scheme. Firms gave a number of reasons for withdrawing but there was frequently a specific reason that brought the matter to a head. For example:

> 'Due to the introduction of computed accounting methods during early 1967, our records were incomplete on the production side. We had to

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[3] op. cit., p. 250.

TABLE G

	Interviewed	*Written comments*	*Telephone conversation*	*Total*
Past participants	26	8	1	35
Year 10 participants	21	–	–	21
Never participated	13	1	3	17
	60	9	4	73

face a question of priorities at that time and it was eventually decided not to bring these specific matters up-to-date. Whereas in the early years of participating in the scheme a number of items of great value were noted, these tended to decrease as action was taken. We reached the stage when the extra work involved did not appear worth it for the amount of benefit. The basic use of ratios and necessary grouping of quite different types of firm meant that every figure that stood out as different had to be thought about and reasons other than our own efficiency level considered.'

'We don't get the results quick enough. We send them in in mid-February and did not get them back until the end of May which was too late. Ours is a complex business. There are not many firms comparable in the scheme. Our weight per thousand is not comparable and there is nobody else with our type of machinery. It was very little help to us and I don't envisage coming back.' (Firm that participated for nine consecutive years.)

The most common reasons given for withdrawal from the scheme fell under two broad but interrelated headings:

(a) lack of comparability between participating firms;

(b) the benefits derived from participating did not outweigh the costs of collecting the information.

Comparability

Comparability was the major problem associated with the scheme examined. It is a problem that all organisers of interfirm comparison schemes must face. Clearly, no two companies are strictly comparable in that they are exactly the same size, use exactly the same methods of production to produce exactly the same products in the same geographical area for the same markets. Comparability is partly a question of attitude. If accountants and/or managers take a negative approach to interfirm comparisons schemes, they will always raise the question of comparability. However, it may be reasonable to assume that firms that participate in an interfirm comparison scheme have a fairly positive approach.

As a former Director of the Centre of Interfirm Comparison has emphasised:

> 'What people really mean when they raise the question of comparability is that firms should be *sufficiently* comparable for useful conclusions to be drawn from comparisons of their figures. From this it follows that the degree of comparability required can only be decided when it is known what sort of conclusions the comparison is intended to provide, in other words, what its objects are.'[4]

Nevertheless, there is a problem of comparability. It is possibly a more difficult one for those schemes that provide a detailed analysis of costs and profits by product groups, than for those schemes that provide an analysis of return on capital employed. The latter measure overall profitability of firms in a particular type of business compared with other firms in that type of business, not detailed operating performance. The scheme examined was designed to provide detailed analysis of cost by product groups. To quote from the trade association brochure:

> 'Each comparison breaks down costs into overheads, material and direct labour and analyses each item into considerable detail, thus enabling companies to recognise out-of-line costs and probably reasons for them.'

The basic units of comparison employed were cost per thousand produced and number of operatives for different operations. In order to make a useful analysis there had to be some basic homogeneity between product mix and between methods of production. Some firms considered this did not exist:

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[4] Harold Ingham, 'Interfirm Comparisons for Management', *Board of Trade Journal*, November 20, 1964, p. 1101.

> (a) 'Practically all the points raised in the report as to areas which would bear critical examination would be attributed to small orders, high work content and a wide range of styles.'
> (Managing Director, medium-sized manufacturer of Product Group D.)

> (b) 'We have a full range of styles and sizes. Nobody is similar. You are not comparing like with like. What value is it.'
> (Secretary, medium-sized manufacturer of Product Group F.)

> (c) 'I think that it is pretty useless. Costs per thousand are not truly comparable – different machines, products and size. Direct material cost did not mean a b . . . thing.'
> (Financial Director, large manufacturer of Product Group A and B.)

> (d) 'Too many of the comparisons can be faulted because of the variety of products and methods of production.'
> (Managing Director, group of companies.)

In the early days of the scheme, the industry was largely production orientated, fewer styles were produced, and few large firms existed. The scheme compared by types of production and some basic homogeneity existed. As the industry became more market orientated, the number of styles and the average size of company increased. In order to survive the small companies had to segment the market and specialise. Their product mix and, therefore, their cost per thousand was different from other firms. The larger firms were producing a wider variety of products and the mix tended to vary between firms. Methods of production also varied between firms, and many medium-sized firms marketing their own products had a policy of product differentiation. It became extremely difficult to find a firm with a *sufficiently* comparable range of products and methods of production to derive any benefit from participation. This problem was exaggerated by the limited participation in the scheme.
For example:

> 'There were only three comparable firms and one had less than 25 employees.'
> (Managing Director, large multi-product firm.)

> 'We dropped out of the scheme because no firms of comparable size participated. It was not worth the cost.'
> (Managing Director, large multi-product firm.)

The managing director of a firm that had participated regularly over a long period named ten firms he would like to compare with. Only one firm participated during 1968. In another case not one firm out of seven named participated and in a third, not one of thirteen manufacturers of Product F participated.

In so far as a return on capital employed comparison does not require homogeneity of product mix and types of machinery, and compares the overall efficiency of similar types of firm, it overcomes one of the basic criticisms of product profitability comparisons. However, there are other comparability problems which can cause difficulties. A company's information normally covered one accounting year, but as companies had different accounting year ends the comparison was sometimes made more difficult. Sales, and consequently cost and profit ratios, in the industry examined were subject to both cyclical and seasonal patterns of demand. Over any one year the sales pattern centred around the Spring and Autumn ranges, and ranges could vary considerably from year to year. The industry examined was concentrated in a limited number of towns and cities, but some firms were located outside these traditional centres and had different cost structures from the firms located in the traditional centres. For example, the comparison confirmed that a company located in a small market town in a mainly agricultural county had lower labour costs but higher carriage costs than its competitors in traditional centres. While this company could identify reasons why its cost structure was different, it was difficult for its competitors to determine why the company had lower labour and higher carriage costs.

Cost-Benefit and Collection Reasons

A second group of reasons for withdrawal, which were not independent of the first group, were those associated with firms comparing costs of participation, due partly to difficulties surrounding the collection of data, with the benefits derived from participation. Some companies withdrew after a number of years because they felt they had reached the stage when the costs outweighed the benefits.

> (a) 'We found the scheme extremely useful. We found out what we want. It confirmed our material usage was high. It revealed it was not high waste but that our price/quality was wrong. It is a very good scheme – we will come back eventually.'
>
> (b) 'The scheme was a good idea generally. We have a good costing system. It told me nothing I did not know already. It confirmed our strengths and weaknesses. I decided there was nothing more to get out of it. I know my weaknesses. I may come back when I have eliminated known weaknesses.'

These and other companies stated they would probably participate again at some unspecified future time. However, it was felt that it would require a very positive attitude on their part for this to happen. Many expressed surprise when told it was five or six years since they last participated, and others commented on the high costs of data collection. A second group of companies took part in the scheme and found the benefits did not outweigh the costs and withdrew without any intention of participating on future occasions.

Closely associated with the cost-benefit reasons was the collection time. It was not the fee paid to the trade association that was crucial but the staff time involved. Because the scheme did require analysis of the multi-product firms by product groups, some companies found data collection a very time-consuming process. The first time a company participates in an interfirm comparison scheme the staff time involved may be considerable. Some firms either had no staff available to collect the information or felt that their staff were better employed on other work. The increasing volume of government paperwork was widely commented upon by the industry though not always mentioned as a specific reason for withdrawal. Some companies felt that with the high costs of collection, it was better to participate every three or four years. However, as will be explained later in this paper, it is difficult for the trade association to operate the scheme on this basis.

Other Reasons

A number of other reasons for withdrawal were mentioned. Some of these were to be expected, such as changes in type of production and temporary re-organisation, and others were specific to the scheme under consideration. The attitude of groups of companies in the industry was interesting.

A number of companies stated that they had become *part of a group of companies*, and considered it to be unnecessary to participate in an external interfirm comparison scheme as they received internal comparisons.

Why should we give information to our competitors when we do not need their information to make our own comparisons? This is a valid but insular argument which is difficult to counter. The summarised view of a large group of companies partly reflects this and other views of the scheme:

> 'In the main our companies did not find the earlier schemes to be of real benefit to them and now that information is available within the group on comparative performances, they do not feel disposed to rejoin the scheme. The main comment was that the scheme was only of real benefit to smaller companies and that the reward was not sufficient to justify the effort involved in reporting the information. Of course, additionally, the absence of any guidance on return on capital has been commented upon.'

The increasing grouping of companies in this and other industries has long term implications for the future of interfirm comparison schemes in the UK. Some groups appear to take the attitude that they will allow one of their least profitable subsidiaries to participate in an external comparison scheme. The results of the comparison are then made available to all the companies in the group.

Views of Year 10 Participants and Non-Participants

The views expressed by Year 10 participants were in the main concerned with the detailed operation of the scheme and, for confidentiality reasons, cannot be reported in this paper. It is interesting to note that two Year 10 participants stated they would not continue because they had become part of a large group of companies.

Seventeen firms and groups that had never participated in the scheme were approached. Four refused to be interviewed and indicated that they had no interest in interfirm comparison schemes:

> 'We are not in the slightest bit interested. It is a great pity more and more people are telling firms how to run their business and not getting on with it. That's the downfall of this country.'

Of the remaining 13, eight were not interested and five showed some interest. Two of the eight firms not interested simply did not believe in interfirm comparisons. While some firms doubted the reliability or comparability of the information and its value, none questioned the confidentiality of the scheme.

> 'I have never participated in the scheme. There is a lot to be said for it. You would get a lot of wrong information from firms. I am not hostile. I almost joined, but the form filling appalled me. Sometimes, I feel envious that I have not got the figures'.
> (Managing Director, large multi-product firm.)

The Operation of the Scheme

The establishment, operation and continuous development of an interfirm comparison scheme requires considerable expertise. It is specialised work necessitating the use of highly qualified staff, who should:

(a) have an academic and/or professional training in economics and/or management accounting;
(b) be familiar with the production methods employed and the marketing operations of firms in the industry as well as the competitive structure of the industry;
(c) have the ability to interpret the outputs of the scheme to financial and non-financial executives;
(d) be acceptable to the senior management of the companies participating in the scheme; and
(e) be capable of developing new and improved schemes.

The trade association studied had difficulty in attracting and retaining suitably qualified staff. The level of participation and the fees acceptable to the members of the association were not sufficient to allow the association to employ on interfirm comparison work the number and quality of staff it wished. It was also difficult to provide a career structure within the trade association.

The trade association charged the following fees in Year 10, which were inclusive of the submission of data, a copy of the comparison, and a verbal report on the company's performance.

(a) £25 minimum per product line for a turnover of £5,000 rising at £0·1625 per £1,000 turnover to a maximum of £50;
(b) collection of figures at £12·50 per day plus travelling and subsistence at cost; and
(c) new participants: collection expenses only for the first figures.

At this time the Centre for Interfirm Comparison charges ranged from £150 to £350 per firm depending upon the size of the firm and the nature of the comparison.

The low fee charged compared with the scheme operated by the Centre for Interfirm Comparison, combined with the decline in the number of participants and the higher travelling expenses associated with verbal reports, resulted in a substantial deficit in Year 10. A trade association not only has to face the problem that its members expect the association to provide a service at a 'reasonable' fee, but, unlike the Centre for Interfirm Comparison, it probably has to operate the scheme continuously. It may not be able to switch staff to other activities. The Centre can run a scheme for two, three, or more years, and if participation drops, it can switch its resources to the development of new schemes or re-introduction of old schemes. The trade association which operated the scheme studied was not in this position; fee income had to be generated continuously in order to pay staff salaries. It was not financially feasible to cease operating the scheme for a period.

The difficult financial situation was reflected in the procedures for providing a company with an interpretation of its ratios and in the staffing of the interfirm comparison section. Up to the end of Year 9 written interpretations were provided to companies. Some companies did receive visits from trade association staff. It was felt that companies possibly were dropping out of the scheme because they did not have sufficient contact with trade association staff, and verbal presentations were substituted for written reports in Year 10. For cost reasons it was not possible to provide a written report and a verbal presentation. Nearly all the companies visited preferred a written report prior to the verbal presentation. They found the verbal presentation had limited impact and that they remembered very little afterwards. It would have been preferable for written reports to have been prepared and sent to the company prior to a visit to discuss the report, and following the visit, a further letter containing any supplementary points raised during the visit. The trade association wished to do this but the fee structure did not allow it to provide such an interpretation service to its members. It was not possible with the number and quality of staff available.

The interfirm comparison was originated some thirteen years before the author's study was undertaken, and by Year 5 of the period covered by the author's study the trade association's interfirm comparison section was headed by two qualified cost accountants supported by two nearly qualified assistants. The cost of salaries in that year amounted to £4,000. From Year 9 onwards there was not a professionally qualified accountant employed on interfirm comparison work. One man completed his ICMA examinations during Year 10. The cost of salaries of staff employed for 3¾ man years during

Year 10 amounted to £4,262. The trade association did employ qualified accountants in other capacities. In particular, it developed a consultancy service, and the qualified accountants previously employed in the interfirm comparison section moved into the consultancy section to earn higher salaries. Because of the financial constraints it was not possible to provide a career structure in the interfirm comparison section, and as soon as a man qualified he requested a transfer to the consultancy service. If this was not possible the tendency was to seek employment elsewhere. At this time all male staff of the Centre for Interfirm Comparison had degrees and/or a professional qualification. The starting salary offered to a man in the region of 23–30 years by the CIFC was between £1,500–£2,250 depending upon age and qualifications. Such a man was recruited at the lowest level of project executive, and was responsible to a senior project manager.

The trade association recognised that if the interfirm comparison scheme was to be continuously developed and improved, and a better interpretation service provided, a higher calibre of better paid staff had to be employed and a career structure provided. It could not continue to rely on the consultancy service for a career structure. However, unless a subsidy was received, this required increased fees and a higher level of continuous participation. There was little indication that the members were prepared to pay a higher fee for a 'service' to members. It was difficult to maintain the current level of participation, and there was no indication that it could be appreciably increased. Other trade associations operating independent schemes must face similar problems to those described in this paper.

Conclusion

Interfirm comparison schemes are difficult for trade associations to establish and operate and only after a programme of continuous development will the full benefits from operating a scheme be secured. It is doubtful whether a high level of participation in a scheme can be maintained if a scheme is offered continuously over a long period. It would seem sensible for all interfirm comparison schemes to be operated by the Centre for Interfirm Comparison, and for trade associations to co-operate with the Centre in the preparation and conduct of comparisons. This would enable a trade association's specialised knowledge of the production methods employed and the marketing operations of the firms in its industry, and of the industry's competitive structure, to be combined with the Centre's expertise in the design and operation of interfirm comparison schemes. The schemes could be operated intermittently which might lead to a higher level of participation, and a willingness to pay an 'economic' fee to the organising body. In fact, most of the comparisons prepared and conducted in over seventy industries and trades by the CIFC were carried out in co-operation with the trade association concerned.

A Reappraisal of the Share Price Maximisation Criterion

Ron Bird

My intention is to reconsider an issue basic to the theory of corporation finance – this being the objective function. In company finance literature, the generally accepted goal is the maximisation of the company's share price and it follows that all investment, financing and dividend decisions are made with this goal in mind.[1]

The objective of maximising the company's share price is consistent with maximising the wealth of the company's shareholders and so maximising their utility. In arriving at this objective function for financial decision-making, most writers point out the reasons for selecting this goal in preference to one of profit maximisation. However, they question whether it is a realistic goal, given that the decisions are made within the company by professional managers whose personal objectives may conflict with maximising the utility of the company's shareholders.[2] It is not the intention of the author to concentrate solely on these matters, but rather to extend the discussion to a thorough reappraisal of the suitability of the share price maximisation criterion for financial decision-making. Specifically, this will involve seeking an answer to three distinct questions which will be considered in the following order

- Does the goal of maximising a company's share price necessarily conflict with one of profit maximisation?
- Would the goal of share price maximisation have to be adjusted if we wish the company to meet the cost of externalities attributable to the company?
- Does a company successfully pursuing a goal of share price maximisation necessarily maximise the utility of its shareholders?

Share Price Maximisation versus Profit Maximisation

Solomon[3] has criticised the goal of profit maximisation on the grounds that:

(a) *It is vague.* He pointed out that the word 'profit' has various meanings (e.g. short-term and long-term, total profit and earnings per share, etc.) and that it is measured in different ways by accountants and economists. It is obvious that to be operational the objective function must be clearly defined. Many would argue that profit maximisation presently does not meet this requirement.

(b) *It ignores the timing of returns.* A dollar of profit receives the same weighting regardless of the period in which it is earned. This implies that the profit maximisation goal neglects the time cost of funds.

(c) *It ignores risk and uncertainty.* Simply by considering the expected profitability of an investment, a company is ignoring any associated risk. It is argued that the share price maximisation objective function incorporates returns and risk, so both are considered in the decision-making process.

In the following discussion, the intention is to show that profit maximisation is totally consistent with maximising the investor's utility. In order to achieve this, all that is required is to have a very clearly defined concept of profit. Solomon's criticisms will be re-examined in terms of the concept of profit developed in the subsequent analysis which is based upon the following assumptions:

(i) all the firm's production possibilities are specified inter-temporally;
(ii) the investor's utility function is specified inter-temporally;
(iii) all the states of the world are specified inter-temporally;[4]
(iv) there are markets for all commodities.

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[1] It shall be assumed that maximising the company's share price is equivalent to maximising the market value of the equity of the company. This is not true where a company makes a share split, bonus issue, or rights issue at significantly below current market price.

[2] For examples of the literature to which I refer see Graham Peirson and Ron Bird, *Business Finance*, (Sydney; McGraw-Hill, 1972) and J. C. van Horne, *Financial Management and Policies*, (2nd edition, Englewood Cliffs, New Jersey; Prentice Hall, 1971).

[3] Ezra Solomon, *The Theory of Financial Management*, (New York: Columbia University Press, 1963).

[4] The term 'states of the world' means all those factors which can affect the equilibrium other than the actions of economic agents (e.g. war, drought, etc.).

Given these assumptions and the existence of an equilibrium (i.e. all commodities are cleared in the market place), this means that all prices are determined. Therefore, both present and futures prices for all commodities are known and are denoted by the vector, p. By explanation, a futures price is what one has to pay now to acquire a commodity at some specified time in the future.

We shall assume that the objective is to maximise the utility of the ith individual, where utility is expressed in terms of the acquisition of a vector of commodities, x_i.

Maximise $U_i(x_i)$

The ability to acquire these commodities is subject to a wealth constraint and, assuming non-satiety, the ith investor will devote all his wealth (i.e. $\overline{W}_i$) to acquire these commodities. The cost of these commodities purchased by the ith investor is specified by the commodity vector, x_i, and the price vector, p.

Subject to $p\ x_i = \overline{W}_i$

We shall assume that the sole source of the wealth of the ith investor comes from his equity investments.[5]

$$\overline{W}_i^* = \sum_j \theta_{ij}\ p\ y_j^* \qquad (y_j^* \varepsilon Y_j)$$

where θ_{ij} = the proportion of the jth firm owned by the ith investor.

y_j^* = the optimum production possibility vector available to the jth firm (which is one of all production possibilities Y_j).

The components of the vector, y_j^*, are negative for all the commodities used as inputs in the production process and positive for the commodities produced by the firm. Therefore the vector, $p\ y_j^*$, is equivalent to the profit (or value) of the jth firm (i.e. π_j).

$$p\ y_j^* = \pi_j^*$$

As the ith investor's one source of wealth is from his equity investments, then his wealth constraint can be rewritten as:

$$\overline{W}_i^* = \sum_j \theta_{ij}\ \pi_j^*$$

Therefore, the jth firm by maximising its profit (i.e. π_j^*) is maximising the wealth (i.e. $\overline{W}_i^*$) of the ith investor.

As $\pi_j^* \geq \pi_j$; then $\overline{W}_i^* \geq \overline{W}_i$

Consider that the ith investor is only interested in acquiring one commodity (x_1) and he can acquire it now (i.e. at time, t) or in one period's time (i.e. t + 1). The diagram (Figure 1) illustrates the consequences of maximising the wealth of the ith investor, assuming he has a quasi-concave utility function.

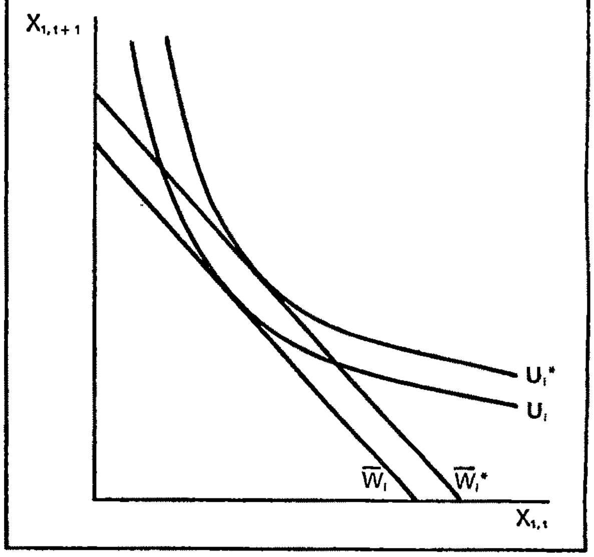
Any increase in wealth (as is illustrated by an increase in real wealth from $\overline{W}_i$ to $\overline{W}_i^*$) results in an increase in the investor's utility. A firm by maximising its profit (π_j^*) will maximise the investor's wealth ($\overline{W}_i^*$) and so his utility (U_i^*). Although this has been illustrated here for one investor, it equally applies to all investors.

The previous analysis has demonstrated that within the economic system as defined by the initial assumptions, a unique concept of 'profit' can be developed. The maximisation of this 'profit' is totally consistent with maximising investor's utility. It therefore appears worthwhile to review Solomon's criticisms of the profit maximisation criterion in the light of the analysis.

(a) Profit maximisation is vague

In fact, profit need not be a vague term as it has been demonstrated that profit is given by the scalar, π_j, which equals $p\ y_j$. There are no difficulties in interpreting this measure of profit in terms of allocating profit to a specific period. The price vector (p) reveals all current and futures prices, while the production vector (y_j) tells us all inputs and outputs. Therefore at any point in time we can measure the present value of the jth firm's profit in any future period, given we know the inputs and outputs occurring in that period. This can be converted to an undiscounted measure of profit by converting the futures prices to spot prices by applying the implicit discount rate to the future prices.[6]

Figure 1



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[5] The intention in this discussion is to show how a company should act in order to maximise an investor's utility stemming from the amount of funds he chooses to invest in this company. This does not deny that he can achieve greater utility by increasing his wealth from other sources (e.g. wages and salaries, gambling, etc.).

[6] The futures prices are the discounted value of the prices you would have to pay to acquire a commodity at some future date. As we assume perfect certainty, the implicit discount rate in these futures prices is the same for all commodities and for all time periods. Therefore, knowing this implicit discount rate, it is easy to convert the futures prices to spot prices and obtain an undiscounted measure of profit.

By contrast the accountant's concept of profit is ill-defined. The lack of agreement between accountants on matters such as the valuation system to be employed, the acceptance of differing accounting principles to be applied to the identical situation, and so on, only serve to illustrate that accountants have reached no general agreement on what the term 'profit' means. This is not surprising as all the information contained in the price vector and the production vector is not available in the real world situation. Therefore, any attempt to measure profit in the way suggested in this paper is very subjective. It would involve estimating the appropriate values for numerous assets and departing from the realisation assumption in its present form. A survey of the accounting literature would suggest that these are problems of which accountants are aware and they will be solved gradually as the need for relevant information receives more attention than the need for an objectively determined profit figure. However, in the light of the current way profit is calculated by accountants, it is not surprising that Solomon would criticise profit as being a vague term.

(b) Profit maximisation ignores the timing of returns

It can be assumed that the previous analysis is a T-period case – all decisions are made now and their repercussions are measured for all future periods. Therefore, it becomes a static model with the jth firm making all decisions on the basis of how it affects the production vector, y_j. The effect of this decision with respect to inputs and outputs and the cost of these commodities (p) will determine whether an affirmative decision will increase or decrease profit, π_j. Therefore all available steps will be taken now to increase profit in line with the goal of profit maximisation.

The measure of profit, $p\ y_j$, is actually the current value of all profits earned by the firm and so is identical to the value of the firm. The analysis can be broken down into a number of time periods simply by applying time sub-scripts to the variables and then the discounted profit can be determined as has been discussed above. As has been intimated, this may prove operationally difficult for the accountant to measure due to such problems as having to measure the value of work-in-process and other problems associated with allocating revenue and expenses to a specific period. It is evident that the goal of profit maximisation does not necessarily ignore the timing of returns – it is an operational problem and not a conceptual problem.

(c) Profit maximisation ignores risk and uncertainty

An examination of the assumptions on which the previous analysis was based indicates that it excludes risk and uncertainty. Once the possibilities of risk and uncertainty are admitted, the analysis is subject to all the vagaries of divergent expectations, differing utility functions and so on. This would require a much more general approach than the one undertaken in the previous analysis. However, it is equally true that the conventional approach to corporate finance and the associated analytical techniques have also failed adequately to build risk and uncertainty into the analysis. It cannot be denied that one presently sees discussions of how risk and uncertainty relate to capital budgeting, financing policy and so on. However, all such discussion can only be regarded as a fudge as the solution is sought within the framework of a perfect certainty, partial equilibrium model. By this I mean that the analysis implicitly assumes certainty with respect to expectations, certainly with regard to utility functions, certainly with regard to the states of the world, and all the analysis is undertaken in a world of isolation from the markets which determine asset prices. For example, it is common to incorporate risk and uncertainty into capital budgeting by specifying expected annual net cash flows by a subjective probability distribution rather than by a single figure. However, it is assumed that each investor has the same subjective probability distribution, and the same utility function, and neglects the possibility of changes in the state of the world. Even worse, it ignores the possibility that the undertaking of the new project may upset the market equilibrium – a criticism only overcome by a more general approach such as that suggested by portfolio theory.

Conclusion

It can be seen that within a model with assumptions at least no more restrictive than those implicit in conventional finance theory, an objective function of profit maximisation is consistent with the goal of maximising the investor's utility. Indeed, it is obvious that profit as defined in the analysis is equivalent to the value of the firm and so they are interchangeable goals. However, it might be argued that maximisation of share price presently enjoys an operational advantage. It has been demonstrated that this is due to problems accountants have in defining profit. In fact, it is quite possible to have a concept of profit which does not suffer from Solomon's criticisms of it as a possible goal in financial decision-making.

Share Price Maximisation and Externalities

It has become popular in recent years to consider the social costs associated with a company's operations.

We have seen companies criticised because of the effect their operations have on parkland, on rivers, on the atmosphere, and so on. These effects are examples of what the economists call externalities, or more specifically, external diseconomies. These are costs incurred by the community or by another enterprise as a result of the operations of the company, without the company itself suffering any similar cost. In these circumstances, the probability of the company operating at its social optimal level of operations is reduced. There are also instances of external economies such as a company releasing stale bread into the ocean which results in improving the quantity and quality of fish and so acts to the betterment of the fishing industry. However, I will restrict any discussion to external diseconomies, specifically to the pollution problem, as it is a problem of great community interest and any conclusions drawn are equally appropriate to other forms of externalities. The intention is to examine what action could be taken to control such externalities and this concerns a reconsideration of the objective function of share price maximisation.

Peirson and Bird[7] present the following example: Suppose that we have two companies, A and B, in the same industry, both generating the same net cash flows, having the identical capital structure and feeding the same amount of waste products into the environment. As investors realise these companies are identical in every respect, the share prices of these companies are the same. Assume that the management of Company A reacts to public criticism of the pollution it is creating and undertakes to spend large amounts of funds to minimise the effect it is having on the environment. As a consequence, company A's cash outflows increase, and, *ceteribus paribus*, the result will be a fall in company A's share price. Therefore, it could be argued that company A would not undertake pollution control because it is inconsistent with the goal of share price maximisation.

However, the market mechanism may work in one of two ways to remove this disincentive for undertaking this expenditure. First, the sales of the company may increase to offset either partially or totally the increase in cash outflows. This may happen due to the fact that people faced with purchasing from the two companies may choose to support the company undertaking the pollution control. Second, the investors may be willing to accept a lower rate of return from company A than from Company B, again because they place some weight on the contribution Company A is making to a 'clean' environment. As a consequence, Company A's share price either may not fall or may not fall by as much as it otherwise might. Of course whether one or both of these factors might occur is only speculative. If we saw much evidence of companies undertaking expenditure on pollution control, this could indicate that the company assumes its share price will not fall (for the reasons mentioned above). Observation would indicate that most companies are not embarking on voluntary pollution control expenditure which might be taken as indicative that the market mechanism does not offset the effect of this added expenditure on share price. On the other hand it may be desirable for a company to undertake some pollution control in order to forestall any form of government intervention. This may explain why a few firms (e.g. BHP) have undertaken large expenditures even where it would appear to be inconsistent with share price maximisation. In fact, such expenditure may well be consistent with a longer-run concept of share price maximisation if it avoids much larger costs the company might have to meet in the future if the government intervened to enforce pollution control.

The question arises that if we cannot expect the majority of companies aiming at share price maximisation to undertake pollution control, then should we seek an alternative objective function? The answer to this question is No. The problem exists because the social costs of the pollution are not priced into the operating costs of the company. They are costs that are being met by the community and it is necessary to encourage the company to meet these costs. As it is unlikely that many companies will voluntarily meet these costs, therefore it becomes necessary for the government to adopt a policy to enforce the socially desired level of pollution control.

The form that this policy should take is the question considered in a paper by Brennan, Walsh and Chisholm.[8] After concluding that any protection the community might expect to obtain from the legal system would be either infeasible or uneconomic, they go on to say: 'Thus, in most cases, the government will be required to use its regulatory and/or fiscal powers directly in order to ensure major improvements in the allocation of resources between clean environment and physical consumption.'

Where the government chooses to use regulatory powers, it is envisaged that these would take the form of fines and/or penal sanctions against a company producing more than a specified amount of pollution (say y tons). Assuming that the company will choose not to violate the regulations the company now faces an additional constraint in its production alternatives due to the imposition of pollution control.[9] If we think of this in terms of a constraint on a company trying to maximise its objective function as in the typical linear programing problem, then cost to the company of each unit of pollution it produces (say x dollars per ton), is readily obtainable from the solution to the dual of this problem. If the government chooses to use fiscal powers rather than regulatory powers, then a tax of $x per ton of pollution would be directly equivalent to effectively restricting pollution to a maximum of y tons.

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[7] Op. cit.

[8] H. G. Brennan, C. Walsh and A. H. Chisholm. *Policy Options for Pollution Control.* (A paper presented at the 45th ANZAAS Congress in Perth, August, 1973.)

Therefore, is it true to say that everybody is indifferent to what form of coercion the government uses in seeking the level of desired pollution control?

The answer is that this statement is clearly *not* true: the owners of the firm would prefer the regulation, while society as a whole would prefer the tax. With regulatory control, the firm may produce y tons of pollution at no additional cost to itself, whereas with the tax of $x per ton it would produce y tons of pollution while paying over to the government $x.y. Clearly, the company would prefer the regulation since this involves least cost, and hence would enable the company to achieve a higher share price than if it faced the pollution tax. On the other hand, under the regulation, the firm has no incentive to attempt to produce less than y tons of pollution, so that its response to the regulation would be to search for a technology which maximises output for a given level of pollution, while with the tax it will be encouraged to attempt continuously to minimise pollution per unit of output. Society as a whole is unlikely to be indifferent between these responses, and can be expected to prefer the tax proposal since it encourages producers to seek continuously a better balance between production and pollution.

One final point is that the existence of these diseconomies may mean that the goal of share price maximisation may conflict with a goal of maximising the investor's utility. Imagine a company evaluating an investment project which is going to increase its share price marginally and so the utility of the investor. However, the investor may suffer some disutility from some pollution caused by the project and so be worse off as a consequence of it being undertaken. On similar grounds, it may be argued that an investor gains prestige (and so utility) simply by investing in a company which undertakes pollution control on a large scale and so is well thought of in the community. Again in these circumstances, the utility derived by the investor is something different from that purely derived from the value of his investment.

Conclusion

The need to control pollution is not likely to be voluntarily implemented by a company wishing to maximise its share price. However, the solution is not to alter the objective function, but rather that it should be implemented by some form of government control. It would be preferable for the community as a whole if the government implemented control via fiscal powers, but the companies would prefer it to take the form of regulations (the less stringent the better). The final point made was that the existence of externalities may be one reason why a goal of profit maximisation may not be consistent with maximising the investor's utility and we shall look at other reasons for this divergence in the next section.

Share Price Maximisation and Maximising Utility

As discussed earlier, it is usual to justify a goal of share price maximisation on the basis that it is synonymous with maximising the utility of the shareholders of the company. In the simplest case where all of an investor's funds are invested in the shares of a particular company, it would appear that the company by maximising its profits is maximising the wealth and utility of this investor. Even this has been questioned in the previous analysis, when it was indicated that wealth and utility are not synonymous (e.g. due to diseconomies such as pollution on the negative side, and due to gaining prestige as a shareholder in a highly-esteemed company on the positive side). In this section, we will examine whether recent developments in portfolio theory have anything to tell us on the same point.

Portfolio theory tells us that the return risk characteristics of investment in a single risky asset are inferior to those available from an investment in a portfolio of these assets. The advantage of holding a portfolio is that it allows an investor to diversify and reduce the risk associated with holding assets singly. For example, where an investor purchases shares in two companies whose returns are perfectly negatively correlated, then when the return of one company is rising, that of the other would be falling by an equal proportion. The combination of the two assets reduces the variations in the return from an investment in either asset singly. Therefore, the holding of both (i.e. a portfolio) provides a significant reduction in risk, as measured by the standard deviation of expected returns. The greatest reduction in risk occurs when the returns of the two securities are perfectly negatively correlated. However, some reduction in risk is possible if the returns are less than positively correlated.

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[9] The company will not violate the regulation when it feels the expected costs of such violations will exceed any associated benefits. The attitude of the company will depend on the risk of detection, the size of the fine or length of any penal sanction, and the attitude of the company to risk.

From all the available portfolios of assets, there exists a set of efficient portfolios. An efficient portfolio offers a given rate of return at a lower level of risk than any other portfolio offering that return. Further, there exists amongst these efficient portfolios one portfolio termed the market portfolio. Given the assumptions in portfolio theory, all investors will hold this market portfolio, which will include all securities held in the proportion of their market values. Where such a portfolio is held, the only source of uncertainty about the return on an individual security is due to uncertainty regarding the return on the market portfolio – termed systematic risk and dependent on the covariance of the individual asset with the market portfolio. The other portion of risk associated with an investment in a single asset is termed unsystematic risk. This portion of risk is peculiar to each particular single asset as measured by its variance, and it is this which is diversified away by holding the market portfolio.

The above discussion would indicate that it is sub-optimal for an investor to place all his investible funds in one security, when he can reduce the risk attached to the investment by spreading these funds among all securities. It is obvious that investors in practice do not hold the market portfolio, although this does not mean that they are necessarily foregoing the benefits they can gain by diversification. Evans and Archer[10] have shown that most of the reduction in risk gained by diversification can be achieved by holding a portfolio consisting of between ten and twenty securities. In practice, we do see a large proportion of investors who do hold portfolios of this size. As a consequence it becomes obvious that a company cannot make a decision purely on the basis of what likely effect it will have on its own share price, as many of its shareholders will hold a sizeable number of other securities. Therefore, the utility of any particular shareholder will only increase if the value of his portfolio of securities increases as a result of the decision made by this one firm. Hence, there exists a possible conflict between the goal of share price maximisation and that of maximising the utility of the shareholder[11].

To digress slightly, the possible conflict alluded to above cannot be treated within the framework of conventional financial theory, where a partial equilibrium approach is taken. The assumption in partial equilibrium analysis is that no decision made by the company will affect the current market equilibrium. Therefore, the price of all other assets will be unaffected by any policies implemented by a company. In this situation, there is no possibility of conflict as, if each company can attempt to increase its share price without affecting that of all other companies, then the goal of share price maximisation will result in maximising the wealth and so the utility of even the diversified shareholder. The problem is that a partial equilibrium approach is not a realistic one. For example, a company embarking on a large new project could be expected to affect the prices of a large number of assets, including the shares of other companies. When a new asset is introduced, it will upset the existing equilibrium and the prices of existing assets well may differ at the new equilibrium.

This can be interpreted in terms of the first section of this paper on profit maximisation. The price vector, p, gave the set of equilibrium prices for all assets. If a company had upset this equilibrium by undertaking a new project aimed at maximising its own profit, it will result in a change in this price vector, p, when a new equilibrium is reached. Therefore at this new equilibrium it is possible that the value (or profit) of this company has increased but that the value of other companies in which the ith investor holds shares has fallen. As a consequence the wealth of the ith individual, as measured by $\sum_j \theta_{ij} py_j$ may have fallen and so his utility is not being maximised.

It is evident that we require to evaluate corporate decisions using a general equilibrium analysis and we are afforded that opportunity by portfolio theory. I wish to develop this discussion by utilising some of the analysis of Sharpe and Bloomfield, and Rubenstein[12].

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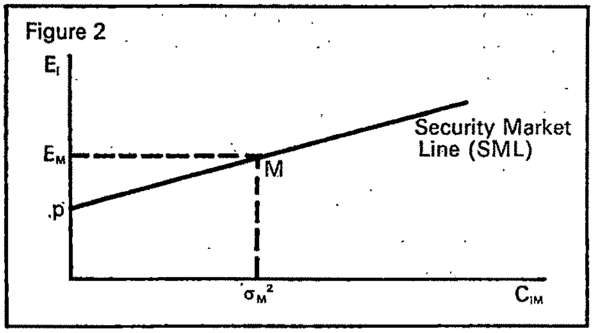
[10] J. E. Evans and S. H. Archer. *Diversification and the Reduction of Diversion: An Empirical Analysis.* The Journal of Finance, December 1968.

[11] Although it has been admitted that investors do not hold the market portfolio, the remainder of the discussion will assume that there are two types of investors – the diversified investor who holds the market portfolio, and the non-diversified one who holds a single security. However the mere existence of investors holding a portfolio of securities means that there is a potential conflict of interests and means that conclusions of the discussion are still applicable.

[12] William F. Sharpe. *Portfolio Theory and Capital Markets.* (New York: McGraw-Hill, 1970.) E. C. Bloomfield. *Portfolio Theory and Investment Decisions*, Department of Accountancy and Public Finance Research Monograph No. 2 (Canberra: The Australian National University, 1973). Mark E. Rubenstein. *A Mean-Variance Synthesis of Corporate Finance Theory.* The Journal of Finance, March 1973.

Sharpe introduced a relationship termed the security market line which is represented in Figure 2.

Figure 2



where E_i = expected rate of return from a risky asset, i.
C_{iM} = covariance of the expected returns of this risky asset, i, with those of the market portfolio.
ρ = rate of return of the risk-free asset.

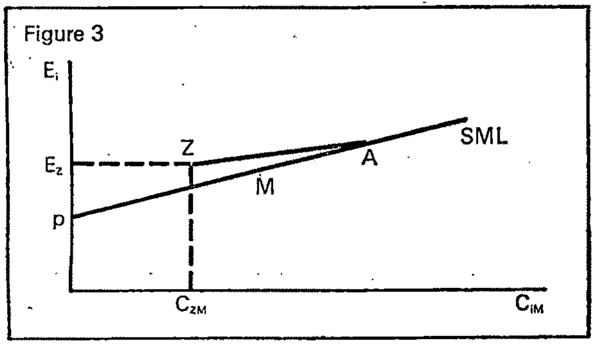
Point M is the co-ordinates of the market portfolio for expected return (E_M) and variance (σ_M^2).

In equilibrium the expected return of all risky assets plotted along this line and the expected return on any single risky asset is given by:

$E_i = \rho + r_s C_{iM}$
where r_s = the extra return required by investors in order to accept additional risk as measured by C_{iM}.

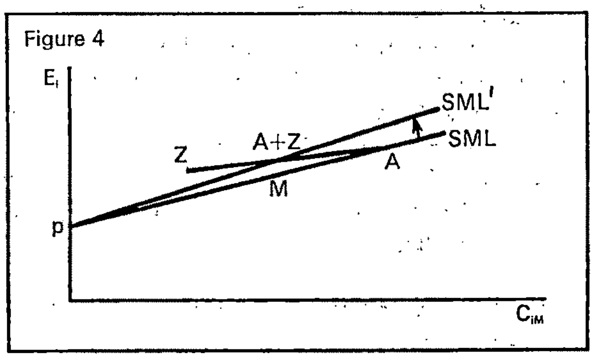
Both Rubenstein and Bloomfield have shown how the security market line may be used to evaluate an investment proposal. Consider that Company A is evaluating project Z which has an expected return of E_z and covariance with the market of C_{zM}, as is illustrated below in Figure 3.

Figure 3



The co-ordinates of Company A after it undertakes project Z will lie somewhere on the line, AZ. As this lies above the security market line, the existing equilibrium will be upset. Both authors suggest that a new equilibrium will be achieved with the security market line rotating upwards (to SML′) as is illustrated in Figure 4.

Figure 4



In conclusion I will spell out some of the implications of the discussion in this section of the paper.

(a) *The SML decision rule for capital budgeting and maximising investor's utility*

The previous analysis suggests a company should accept any project which plots above the SML. As a consequence, the SML will rotate upwards to a new equilibrium position. At this new equilibrium, the investor will be able to obtain a higher rate of return for any given level of risk (as measured by C_{zM}), the value of the market portfolio will have risen, and there will be an increase in the investor's utility.

In portfolio theory, each investor is assumed to hold the market portfolio and, therefore, if the management of a company really wants to maximise the utility of its shareholders it makes all its decisions with respect to how they affect the value of the market portfolio. The share price maximisation goal is replaced by the goal of maximising the value of the market portfolio.

(b) *Interests of diversified versus non-diversified investors*

Portfolio theory suggests that the risks associated with an investment in a specific company are made greater for a non-diversified investor than they are for a diversified investor. The reason for this is that the diversified investor holding the market portfolio has diversified away one portion of risk, termed unsystematic risk.

Bloomfield discusses a numerical example of the case we have examined where company A is considering project Z. His findings are that both investors suffer an equal drop in expected rate of return from their investment in company A if it undertakes project Z. As compensation, the diversified investor's risk associated with the investment in company A (as measured by the standard deviation of expected returns) has decreased significantly. However, the equivalent decrease in risk for the non-diversified investor has been minimal.[13]

This suggests that management has to determine whose interests are to be held paramount when it is making any financial decisions. In addition, any decisions based upon analytical techniques developed from portfolio theory may result in undesirable decisions being made for people not holding the market portfolio.

(*c*) *Conflict between conventional approach and portfolio theory approach*

It has become apparent that analysis based upon the conventional approach can suggest a different decision to that based upon portfolio theory. Again consider company A evaluating whether it should undertake project Z. The conventional approach would tell it to undertake project Z provided the rate of return on this project (i.e. E_z) exceeds the company's cost of capital. This cost of capital is determined in the market and its value is dependent upon how the investors perceive the risk of the company. The portfolio theory approach tells us that the project should be undertaken provided the expected rate of return plots above the SML. In effect the cost of capital is equivalent to $\rho + r_s C_{zM}$, and so is dependent upon the covariance of the expected returns from the project Z and those expected returns from the market portfolio. This cost of capital differs from that used in the conventional approach and is dependent upon the risk characteristics of the project, rather than those of the company as a whole. The obvious conclusion is that a company considering a project may often come to a different decision depending on the approach which it takes.

Conclusion

Portfolio theory substitutes the goal of maximising the value of the market portfolio for the convention of maximising the company's share price. This new goal would satisfy those investors holding the market portfolio, but we have seen that it might not be in the best interests of the non-diversified investor. Therefore, the management has a real conflict with regard to serving the interests of the different types of investor, diversified and non-diversified. The interests of the latter could still be best served by a company basing its approach on the conventional analysis aimed at maximising share price. Finally, we saw (as would be expected) that the decisions of a company would sometimes differ depending upon whether it used the conventional approach (and goal) or the portfolio theory approach (and goal).

Summary

The following are the suggested answers to the three issues raised at the beginning:

(*a*) The goals of profit maximisation and share price maximisation are equivalent where 'profit' is clearly defined. Most of the criticisms of profit maximisation are really due to the fact that accountants have no clear concept of the meaning of 'profit', or, if they do, they are not willing to give up their desire for objectivity in order to measure it.

(*b*) It was argued that if companies actually aimed at share price maximisation, it would be unlikely that they would voluntarily undertake expenditure on pollution control as it is in conflict with the objective function. However, it was suggested that the solution is not to seek an alternative objective function, but rather for the government to enforce the optimal level of pollution control via regulations or fiscal controls. The former (i.e. regulations) may be preferred by the companies; the latter may be more in the community's interests.

(*c*) Portfolio theory tells us that a company aiming to maximise the utility of its investors should make decisions aimed at maximising the value of the market portfolio, rather than attempting to maximise its own share price. However, many investors do not hold a diversified portfolio and any analysis based upon portfolio theory and the goal of maximising the value of the market portfolio may conflict with their interests.

Acknowledgement. I wish to thank Peter Standish. Cliff Walsh and Frank Milne of the Australian National University and Graham Peirson of Monash University for helpful comments on earlier drafts of this article.

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[13] The following is a fuller explanation of Bloomfield's findings: 'The diversified shareholder has seen the expected return of an original share in firm A fall from 20 cents to 16 cents but at the same time the associated risk (in standard deviation measure) has fallen from 15 cents to 10 cents. On the other hand, the non-diversified shareholder has suffered the same fall in expected return from 20 cents to 16 cents, but he has not had the compensation of a significant fall in risk. The risk level, now σ_{A+z}, remains virtually the same, a slight fall from 30 cents to 29.79 cents having occurred'.

Behavioural Aspects of the Inflation Accounting Controversy

Thomas W. McRae and Richard Dobbins

The accounting profession has wrestled with the problem of adjusting accounts for inflation for over forty years. Several large scale research projects on inflation accounting have been launched during the last few years and the weight of literature published on this topic is formidable.

Yet despite this volume of research and publication the number of companies who have actually implemented inflation accounting in practice is surprisingly small. The work of Philips of Holland[1] on inflation accounting is well known and we are aware of a few other companies in the USA, UK and Australia who are operating various forms of inflation accounting[2] but the proportion of companies adjusting their accounts for inflation is not substantial in either number or equity value.

The conventional reason given for this slow diffusion of inflation adjusted accounts is that the theory of inflation adjustment needs further development. This, presumably, is the justification for the considerable amount of money provided for research on inflation accounting over the last few years.[3] The University of Bradford Management Centre received one such grant and our first, traditional step was to examine the existing literature on the subject.

The initial effect of the survey on our research team was a sense of surprise at how little the theory of inflation accounting seems to have progressed over the last forty years.[4] The ideas and methods of inflation accounting put forward by Sweeney in the early 1930's differed little from the recent Exposure Draft 8 of the English Institute of Chartered Accountants (ED 8) proposals. Is the theory of inflation accounting an endless treadmill on which each generation of accountants must toil until exhaustion?

It occurred to us that this type of situation might indicate that we were working on what George Polyani has called a *dilemma* rather than a *problem.* Polyani defines dilemmas as insoluble problems which are insoluble because the problem has been incorrectly defined. In other words we are asking the wrong questions.

We applied this approach to the accounting for inflation controversy and came up with the conclusion that the question we should be asking was not 'How do we adjust accounts for inflation?' but 'Why has some form of inflation accounting not been adopted by accountants?'

The solution to the first question is likely to be provided by accountants, economists and statisticians, the answer to the second by students of human behaviour.

The answer to the second question will be provided by studying the objectives, motives, values and norms of the individuals and groups involved in the inflation adjustment controversy.

So far as we have been able to discover, no research into inflation accounting has been carried out by behavioural scientists. Perhaps this provides us with the key to the endless treadmill of inflation accounting?

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[1] Quoted by G. A. Holmes. Replacement Value Accounting (*Accountancy* March 1972).

[2] J. H. MacNeill. Accounting for inflation abroad (*Journal of Accountancy* August 1961) and R. Gynther. Accounting for price changes. (*The Chartered Accountant in Australia.* December 1971).

[3] Research on inflation accounting is being conducted at the Universities of Lancaster, Bradford, London, Manchester, Aston and probably elsewhere.

[4] Most of the 'current' controversies are discussed in H. W. Sweeney. Stabilised Accountancy. (Harper and Row, 1936. Holt Rhinehart Winston. Reprint, 1964).

See also Accountants Standards Steering Committee. (Inflation and Accounts' Exposure draft 8 (ED 8). (1971) Institute of Chartered Accountants in England and Wales.

With this view in mind our research group carried out a series of interviews with representatives of the several groups concerned with implementing inflation accounting. Our aim was to detect dissonance between the objectives, motives and values etc., of these various groups which might account for the slow diffusion of inflation accounting techniques. In other words, what factors motivated each group to take the position it did with regard to inflation accounting?

Our first problem was to identify all of those groups involved in inflation accounting. Membership of these groups is not mutually exclusive. The following groups have shown some interest in the inflation accounting controversy:

The professional accountant
The management accountant
The government/civil service
Academics, both accountants and economists
Shareholders and Financial analysts.

We will examine each of these groups in turn and attempt to discover the factors determining the attitudes of each group to inflation accounting. By 'professional accountant' we mean those accountants, mainly partners, working in public practice. By 'management accountant' we mean those accountants working in industry and commerce. Needless to say, each group is not entirely homogeneous in its opinion and we are seeking the modal view.

The professional accountant

The key motive determining the attitude of the professional accountant towards inflation accounting may be summed up under the title of 'operational efficiency'.

If some form of adjustment for inflation is to become mandatory the method must not be too complicated and the results must be presented in a form which can be tested, without too much difficulty, by an auditor.

The single index Current Purchasing Power (CPP) method of adjustment satisfies both these criteria, and so it is not surprising that both the UK and USA professional accounting associations have advocated single index adjustment systems.[5]

The ED8 proposals advocate adjustment by a single *consumer* or *retail* price index on the grounds that this is the true alternative to investment for shareholders and the question we are attempting to answer when we adjust accounts for inflation is 'what would be the present value of the money equivalent invested in this company if it had been spent on consumption goods'.

A second group of professional accountants has opposed any form of adjustment for inflation on the grounds that the annual accounts reflect historical cash flows and unexpired revenue/expenditure, and these figures can be vouched as accurate. Any attempt to modify historical figures is hazardous, since 'opinion' enters into the valuation process. Accountants, it is argued, are neither valuers nor soothsayers, any attempt to practice these activities can only lead the profession into disrepute. Recent history, they claim, supports this view.

Our discussions unearthed a third, rather large, group of professional accountants who showed little interest in the inflation adjustment controversy. They appeared to possess little knowledge of the issues involved but sided with the no-adjustment group, presumably because this opinion avoided the tiresome process of having to learn the techniques of inflation adjustment.

We met few professional accountants in the UK who supported the replacement cost valuation approach.

Management accountants

On the inflation adjustment question, management accountants made up a more homogeneous group. The annual accounts provide a barometer of their companies' level of performance. They are, therefore, careful to examine all proposals, such as ED8, with a view to the effect it may have on their public image as efficient performers. The Westwick-Cutler study[6] and every other study known to the author has tended to *reduce* the profit performance of most of the companies examined. The US study by Rosenfield[7] reduced the rate of return of all of the 16 companies examined. The Westwick-Cutler study reduced the profits of 75% of the companies. The application of inflation adjustment to accounts will, therefore, tend to diminish the apparent performance of management if rate of return on capital invested is taken as the criterion of performance.

However, the management accountant holds an ambivalent attitude to the inflation adjustment issue since he believes that lower published profits will mean lower company taxation. We shall question the validity of this assumption later in the article, but this belief was held by many management accountants. Certainly the *distribution* of the total company tax bill *would* be affected by inflation adjustment. The adjusted tax bill is of particular relevance to the controversy over the windfall profit on debt reduced by inflation. The ED8 proposals claim, correctly in our opinion, that this reduction in the real value of debt is a profit, a windfall non-operating profit, but still a profit. Since windfall profits are subject to tax it could be argued that this windfall profit should be taxed or at least set off against reductions in company tax caused by inflation adjustment elsewhere.

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[5] But each institute had advocated the use of a different index.

See AICPA (US Accounting Institute) 'Financial statements restated for general price level changes' (*Journal of Accountancy*. September 1969).

[6] C. A. Westwick and R. S. Cutler. The Impact of Inflation Accounting on the Stock Market. (*Accountancy*. March 1972).

[7] P. Rosenfield. Accounting for inflation – a field test. (*Journal of Accountancy*. 1969).

We found a strong negative attitude by management accountants to the proposal that windfall profits on inflation reduced debt should be taxed. Various replacement cost theories were put forward to justify this attitude. We doubt whether these theories would stand up under cross examination.[8] If the gain on inflation reduced debt were taxed the tax benefits of inflation adjustment would be much reduced.[9] We conclude that management accountants have an ambivalent attitude to the question of whether or not accounts should be adjusted for inflation.

There is, however, no ambiguity whatsoever on the question of *which* system of inflation adjustment the management accountant prefers. The management accountants we interviewed were unanimous in their opinion that specific indices should be used to adjust the accounts, i.e. they preferred some variant of replacement value accounting. This is not surprising. The management accountant is concerned with the efficient operation of each of the many sub-systems making up the business. Inflation affects each of these sub-systems in a different way, so the management accountant prefers to use specific indices which provide a more accurate picture of the movement of value in each sub-system.

A second and more important point is that the management accountant has *control* of the inflation adjustment procedure if specific indices are used. The CPP system uses a single index calculated by a government department while the design and calculation of specific indices will be controlled by the management of the company concerned,[10] the management accountant having particular responsibility for the activity. This is an important consideration. The management accountant appears to believe that the single CPP index could result in arbitrary and *uncontrollable* fluctuations in reported profit. The specific indices are viewed as 'controlled' variables; it would be difficult for the government to set up a series of indices to cover all of the various industrial permutations.[11]

The management accountant appears to be sympathetic to inflation adjustment of values so long as he *controls* the choice of specific variables to be adjusted and also the choice of index to effect the adjustment. The imposition of an externally calculated index or indices is viewed with some alarm as a loss of sovereignty.

In support of this statement we note that every industrial firm we interviewed which had introduced inflation accounting procedures produced revised figures to us which *reduced* their liability to company taxation. They all ignored the 'profit' on reduced value of debt.

The government and the civil service

On technical matters the government tends to rely on the opinion of the civil service who, in turn, consult with outside experts. However, in the case of inflation adjustment of accounts we foresee a political clash across party lines.[12] The Labour Party, supported by the trade unions, has made much political capital out of the large increase in company profits during the 'price freeze' period of 1972/73. If, as seems likely, the adjustment of accounts for inflation shows a part of these profits to be illusory, the attack of the Labour Party would be blunted. Almost every study of inflation adjusted accounting known to the authors has reduced the profits shown in the accounts, in many cases by substantial margins.[13] Evidence for this is available in Cutler and Westwick, Rosenfield, Myddleton, Pollard and Pearcy.[14] The largest reversals are suffered by some of the companies with the most militant trade unions, such as the National Coal Board,[15] and the motor car industry. It is difficult to avoid the conclusion that the attitude of politicians and trade unionists to inflation adjustment would be coloured by the effect that this adjustment might have on supporting or undermining their political objectives.

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[8] See L. P. Foldes. The treatment of Loan Capital (*The Accountant*. 1971).

[9] See Westwick and Cutler op. cit.

[10] This is the case, for example, in Philips of Holland.

[11] The specific indices would, of course, be audited by the external auditor.

[12] The decision by the Department of Trade and Industry to set up a special committee under Mr. Sandilands to look into the effects of inflation on accounts appears to have been motivated by the late realisation of certain politicians that inflation accounting has political implications which may be too important to be left to the accountant.

[13] If 'profit' on net monetary liabilities is ignored, the reduction is very substantial.

[14] Westwick op. cit., Rosenfield op. cit, D. R. Myddleton, Consolidated Nationalised Industries Accounts 1948/1970. (*Accounting and Business Research* Spring 1972). R. Pollard. Stabilised Accounting in an Engineering Company (unpublished MSc dissertation. University of Bradford 1973) and J. Pearcy, Inflation adjustment of 12 UK companies. 1959/68. (*UEC Journal*. October 1970).

[15] Myddleton op. cit.

Our conversation with civil servants on the inflation adjustment issue leads us to believe that they favour adjustment. As one civil servant put it to us, 'The government decides how much money it wishes to raise from company taxation. If inflation adjustment reduces the absolute level of profit the rate of company taxation will be raised accordingly. The advantage is that we will then know what percentage the state is *really* taking. This is obscured by inflation at the moment'.

The Department of Trade and Industry (DTI) have already used the De Paula system of inflation adjustment to arrive at 'real' company profits. They are particularly concerned with monopoly profit. There is some concern that failure to adjust accounts for inflation has resulted in an inequitable distribution of taxation between companies. Retail and property companies *may* be paying too little tax and manufacturing companies too much. When it comes to adjusting *individual* company accounts, there appears to be a bias in favour of the specific index system. This, we believe, is caused by the close liaison between the civil service and certain academic economists.

Academics

Controversy is the meat on which academics thrive and publication is their ladder to promotion. The attitude of academic accountants and economists is much influenced by these two factors.

The academic establishment, with a single exception, is united in its advocacy of inflation adjustment. There is, however, rather less unanimity on the method of adjustment to be adopted. Myddleton[16] and Hendriksen[17] have advocated a single price index for adjustment while Gynther[18] and Zeff,[19] Edwards and Bell[20] and Mathews[21] have advocated using a set of specific indices.

Gynther[22] describes no less than fifteen different systems of adjusting accounts for inflation, but many of these seem to the writer to be somewhat eccentric. However, by suggesting such a plethora of competing systems, academics have provided an endless source of dispute which tends to delay the adoption of any one system. Surprisingly little has been written by academics on the *practical* problems encountered in implementing inflation adjustment. This may indicate a lack of involvement in this area. Our own researches suggest that the implementation of specific index adjustment is quite difficult – Gynther[23] disputes this.

Since the academic accountant does not have to *implement* the system but only to discuss it, he will tend to advocate the theoretical ideal. The weight of academic opinion seems to support the specific index approach and replacement accounting. It is a pity that this support has not been backed up by more research on the practical problems encountered in designing and applying specific indices on a regular basis. (We exclude Gynther from this criticism.) We conclude that the academic world so far as it takes an interest in the inflation accounting controversy, has explored and elaborated on the theoretical issues involved. This has provided the controversy and publications which provide the objectives of academic endeavour. We failed to find evidence of research into the practical problems of applying the more complicated schemes advocated on a day-to-day basis. The latter type of research is, of course, a good deal more time consuming than the former.

The many different systems of inflation adjustment advocated by academics could supply useful delaying tactics to those who oppose any form of inflation adjustment.

Shareholders

Shareholders can be divided into two categories: the financial institutions, who hold around 45% of the market value of equity, and the private shareholder.

If the view of investment analysts can be taken to represent the view of the financial institutions we have a clear presentation of their collective view set out in their journal.[24]

The analysts 'much welcome acceptance of the argument that company accounts based on historical cost accounting have become distorted by inflation'[25] and they 'support any proposals which will guide companies into reporting to shareholders in this (inflation adjusted) way'.

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[16] D. R. Myddleton. The effects of currency debasement as illustrated by Gas Industry Accounts (*The Accountant*. May 1970) and op. cit.

[17] E. S. Hendriksen. Accounting Theory. (*R. D. Irwin*. 1970).

[18] R. Gynther. Accounting for price level changes. Theory and procedures. (*Pergamon Press* 1966.) Capital maintenance, price changes and profit determination. (*Accountancy Review*. 1970).

[19] S. A. Zeff. Replacement cost. (*Accounting Review*. Oct. 1962).

[20] E. O. Edwards and P. W. Bell. The theory and measurement of business income. *University of California Press*. 1961.

[21] R. L. Mathews. Income, price changes and the Valuation controversy in accounting. (*Accounting Review*. July 1968).

[22] R. Gynther. Accounting for changing prices. (*The Chartered Accountant in Australia*. December 1971).

[23] Op. cit., p. 20.

[24] Accounting standards ED8 and 11. (*The Investment Analyst*. Sept. 1973).

However it soon becomes clear that the investment analysts are cautious in their support. 'We strongly feel that there should be no substitution and that the information regarding inflation should only be supplementary', and later, 'we believe the information provided is to a great extent too theoretical to be useful'. The analysts are not happy with the CPP system of adjustment advocated in ED8. 'We would prefer to know *more scientifically* what part of the conventionally calculated profits are not prudently available for distribution without eating into the fabric of the company.' 'We would prefer the use of specific indices, *subjective though they may be*, of the kind advocated by the proponents of replacement cost accounting.'

The analysts also believe that 'theoretical capital gains or losses, arising from the balance of a company's short term and long term assets and liabilities . . . are theoretical capital gains or losses . . . undistributable and not relevant to earnings per share. The market already allows for the impact of gearing when valuing shares.'[26]

The view is clearcut, the argument supporting it somewhat less so. The analysts claim that

1 CPP adjusted figures are 'theoretical'. 'Theoretical' appears to mean 'not equal to actual cash expenditure', but the same criticism applies to specific indices.

2 'CPP adjustments are too complex'; again specific indices are a good deal more complex. This is admitted by the analysts themselves on page 3 of the 'comments'.

3 CPP calculations are said to be 'subject to significant margin of error'. So also are all specific indices. Error implies a correct measure from which there is a deviation. But this correct measure is exactly what we are trying to find. It is not obvious how 'margin of error' can be measured or compared under these circumstances.

4 Government indices are subject to retrospective adjustments, claim the analysts, therefore the accounts would have to be re-adjusted in later years. The same criticism applies to specific indices; in retrospect it quite often becomes obvious that sampling errors have occurred in specific indices in earlier periods.

The analysts' position is summed up as follows: 'If the specific indices of replacement cost accounting are applied to re-value fixed assets and working capital, information is provided which might possibly approach the truth, and we believe it takes us closer to reality in showing the real effects of inflation. It is a discipline which forces a company to maintain the value of its assets and therefore its current earning power and it is in the ability of a company to generate real profits that we as analysts are concerned.'

This is a statement of belief unsupported by factual evidence. What is meant by the words 'truth' and 'reality' and 'real profits' in this context?

It may well be that this statement of belief is true, but the arguments used to support it are even more damning when used against specific indices.

We have spent some time discussing this 'comment' by financial analysts on ED8 because we believe that it illustrates the main contention of this essay, namely that the attitude of financial analysts to inflation accounting is initially determined by behavioural factors and subsequently economic arguments are marshalled to support this attitude.

Our discussion with analysts suggests that they are aware of 'the extreme importance of the question of adjusting accounts for inflation'[27] but they are sceptical of the ability of professional accountants to effect this in an accurate manner. They do not want the accountants to come between the analysts and the historical description of the cash flows. Therefore, they 'strongly feel that there should be no substitution and that the information regarding inflation should only be supplementary'. The analysts want more *information* but a minimum of *adjustment*. The analysts would prefer to carry out the adjustments for themselves.

This attitude is perfectly reasonable, but we cannot understand how the analysts reconcile it with their support for the Philips specific index adjustment system which totally integrates the value indices into the day-to-day accounting procedures.

We conclude that analysts support the disclosure of supplementary information on the effects of inflation on accounts but oppose the ED8 proposals. The economic and statistical arguments put forward against ED8 are rather weak and this supports our contention that these arguments were put together *after* the decision to oppose the proposals had been taken on other behavioural grounds.

This said, we believe that if the government is to take advice on inflation adjustment of accounts then the financial analysts are likely to provide the best advice, in that their interest is most likely to coincide with that of society as a whole. They are knowledgeable, interested, and less personally involved.

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[25] Ibid. p. 47.

[26] Ibid. p. 48.

[27] Ibid. p. 47.

The private shareholder has shown little interest in the inflation adjustment controversy. Few private shareholders understand the annual accounts whether adjusted or unadjusted for inflation. They appear to depend upon the media for advice.

Conclusion

We began this article by pointing out that the inflation adjustment controversy has been with us for over forty years. In recent times the argument has switched from discussing 'should we adjust for inflation?' to 'which method of inflation adjustment should we employ?'. The end result in both cases has been the same; little practical work has resulted.

We believe that the technical arguments about methodology have been used to obscure the true issues which concern the personal interests of the various groups affected by inflation adjustment. There is nothing devious, let alone wicked, about special interest groups pursuing their own objectives. However, we see little point in still more resources being poured into economic and technical research on inflation adjustment when the real obstacle to implementing the method lies in the vagaries of human nature.

By setting out the special interests of each of the groups affected by inflation adjustment, we hope we may have contributed to the clarification of this problem. It may be that the conflict of interest between these various groups is so marked that a generally accepted system of inflation adjustment will never be agreed. However, since every group except the professional accountants appear to support specific index adjustment it would seem that this method is most likely to meet with general acceptance in the long run.

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Why Use General Purchasing Power?

Reg S. Gynther

This paper is really the third in a series. The first paper[1] examined behavioural factors which underlie different perceptions of the firm and of the way in which accounting for the firm should be carried out. The second paper[2] showed how these different perceptions of the firm are closely related to different perceptions of the capital that should be maintained intact before profit can emerge when accounting for changing prices. The second paper went on to demonstrate that accounting for the effects of changing prices is more directly concerned with capital maintenance than with periodic asset valuations and short-term profit determinations. In order to prevent confusion, it also urged that discussions in this area should be careful to distinguish between capital maintenance concepts and methods on the one hand, and asset valuation concepts and methods (and their related profit determination ideas) on the other. The various combinations of capital maintenance concepts and asset valuation methods were displayed in a matrix.[3]

The purpose of this (third) paper is to analyse critically the different reasons given by those who want to use general purchasing power in their proposals for accounting and/or reporting reform – i.e., for asset valuation and/or capital maintenance. These reasons are classified under five headings and are examined in turn. Some of the arguments used here by this writer are scattered throughout his book in this area,[4] and in some related papers.[5] These arguments are now drawn together, and it is hoped, made clearer. New arguments are added, and some support is drawn from some of the other people who have criticised the advocated use of general purchasing power.[6] A clearer exposition of what this writer advocates in lieu of general purchasing power will have to be the subject of a fourth paper. Some indications are included below, but in the meantime anyone interested would obtain a fair idea from his book.[7]

At the outset it should be stated that none of this writer's arguments will be based on the practical problems that surround the actual construction of a general index (or an index of prices of consumer goods). That is, they will not be based on problems such as those of selecting the items to be included in the basket of commodities for the index, of choosing individual prices, and of deciding on the weighting to be given to each item.[8] An attempt will be made to adhere to conceptual matters.

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[1] Reg S. Gynther, 'Accounting Concepts and Behavioral Hypotheses', *Accounting Review*, April, 1967, pp. 274–290.

[2] Reg S. Gynther, 'Capital Maintenance, Price Changes and Profit Determination', *Accounting Review*, October, 1970, pp. 712–730.

[3] Ibid., p. 720. A development of this matrix is included as Appendix 1 to this paper.

[4] Reg S. Gynther, *Accounting for Price-Level Changes: Theory and Procedures* (Oxford: Pergamon Press, 1966).

[5] For example: Reg S. Gynther, *Accounting for Price Changes – Theory and Practice* (Society Bulletin No. 5) (Melbourne: Australian Society of Accountants, 1968); and 'Accounting for Price-Level Changes – One General Index or Several Specific Indexes?', *Accountancy*, July 1962.

[6] For example: R. L. Mathews, 'Price-Level Changes and Useless Information', *Journal of Accounting Research*, Spring, 1965, pp. 133–155.
L. S. Rosen, *Current Value Accounting and Price-Level Restatements* (Toronto: The Canadian Institute of Chartered Accountants, 1972), especially Chapter 4.
John B. Ryan, 'Baying the Moon: Myth of Purchasing Power as a Constant Unit of Measure', *The Australian Accountant*, November, 1972, pp. 383–388.

[7] Op cit.

[8] *If* it were conceptually correct to use a general type index (or some other index) for accounting reform, accountants would need to press, in the construction of the index, for those improvements that they perceived to be necessary. In the meantime, the use of the existing index would, most likely, result in much better information than would be the case if they used no index at all.

1. A 'Unit of Measurement'

Many advocates of accounting reform in times of rising prices argue for the incorporation of changes in general purchasing power into accounting and reporting processes in order to provide a 'unit of measurement'. Moonitz is one of these advocates. He recently wrote:

> 'What we are searching for is either a type of money which is constant in its power to command other goods and services (and that type has never appeared) or a method which enables us to measure the *different* exchange-values of money, at different points in time, and therefore to restate them in terms of a single unit of constant exchange value. The latter cannot be done directly – there is no market-place for dollars of different dates (and purchasing-powers). It can be done indirectly, provided we have a measure of the things money can buy at different points of time. This measure is present in an index of prices in general, and the more general the better.'[9]

In all fairness, the reasoning that underlies statements like this should be presented here, and this can be done best by someone who believes in what he is saying. We therefore quote again from Moonitz:

> 'Among other matters, measurement theory concerns itself with different "scales" of measurement and their inter-relationship. To measure the length of an object, for example, we need a scale based upon a unit such as a metre or a foot. If the length is 10 metres, the same identical length may also be expressed in terms of a different unit, and the result expressed as 33 feet (approximately). To measure the weight of an object, we need a scale based upon a unit such as kilogram or a pound. A weight of 10 kilograms for a given object is identical with a result of 22 pounds (approximately). The attribute "length" or the attribute "weight" may be expressed in one unit or in another. Once expressed, the result may be transformed from one unit to the other. But the difference in the numerals has no significance . . .
>
> 'A similar result follows in price-level accounting where we are trying to measure the change in the "exchange-value of money", the change in the unit employed in accounting to measure the power of money to command goods and services in the market. . . . For example, a rise in an index of general purchasing-power from 100 to 200 is interpreted as a reduction in the exchange-value of money by one-half. The dollar in its function as the unit used in our scale of measurement has shrunk by 50 per cent.
>
> 'A balance sheet restated for this effect, and for this effect alone, presents a restatement (transformation) of the underlying financial data from one unit of measurement to another; for example, from the "dollar at end-of-year 1965" to the "dollar at end-of-year 1970". But this restatement from one unit to another does not reflect any change at all in the attribute measured. The difference between the two numerals, e.g., 'total assets in terms of dollars at end-of-year 1965" versus the same total in terms of "dollars at end-of-year 1970" has no significance, any more than the difference between metres and feet or between kilos and pounds had any significance in the earlier examples.'[10]

Similar 'unit of measurement' statements have been made by The Research Foundation of The Institute of Chartered Accountants in England and Wales,[11] the Accounting Principles Board of the American Institute of Certified Public Accountants,[12] Chambers,[13] Stamp,[14] Heath[15] and others.

However, this implicit assumption that we can obtain a standard 'unit of measurement' based on general purchasing power does not stand up to critical analysis. It might be *physically possible* to calculate a general index in any country, but it would have no real meaning to any one entity (e.g., person, firm, company, etc.). For example, at any point of time the USA dollar does *not* mean the same thing to the many managers of entities in the USA, and the pound sterling does *not* mean the same thing to the managers of entities in Great Britain. People in those countries do not *see* themselves holding 'general purchasing power' when they have money in their pockets; they *see* themselves holding specific purchasing power for those relatively few things (out of a huge range of available goods and services) that they are likely to buy.

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[9] Maurice Moonitz, 'Price-Level Accounting and Scales of Measurement', *Accounting Review*, July, 1970, p. 469.

[10] Ibid., pp. 465–466.

[11] *Accounting for Stewardship in a Period of Inflation* (London: The Research Foundation of The Institute of Chartered Accountants in England and Wales, 1968), pp. 5–8.

[12] *Financial Statements Restated for General Price-Level Changes* (Statement No. 3 of the Accounting Principles Board) (New York: The American Institute of Certified Public Accountants, June, 1969), p. 3.

[13] Raymond J. Chambers, *Accounting, Evaluation and Economic Behavior* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966), pp. 93–96; and his 'Measurement in Accounting', *Journal of Accounting Research*, Spring, 1965, pp. 32–62.

[14] Edward Stamp, 'Income and Value Determination and Changing Price-Levels: An Essay Towards a Theory', *The Accountant's Magazine*, June, 1971, pp. 277–292.

[15] Loyd C. Heath, 'Distinguishing Between Monetary and Nonmonetary Assets and Liabilities in General Price-Level Accounting', *Accounting Review*, July, 1972, pp. 458–468.

On the other hand, these same people do know exactly what standard measures like metres or kilograms represent. If they don't, they *can* obtain standard rulers and weights to give them the exact meaning. The precision of their metre rulers can be checked in Paris by comparing them with the distance between two microscopic lines on a specific bar of platinumiridium kept under specific physical conditions – i.e., as a standard measurement of length called a 'metre'.

But nobody in the USA, for example, would ever know what was meant by a measure called 'a dollar of general purchasing power' even if one were decreed to exist. A dollar 'of general purchasing power' can never be a standard unit of measurement alongside metres and kilograms, etc.

> 'Dollars serve merely as a convenient means of exchange but money values and market prices reflect individual subjective valuations.'[16]

It is no use saying that any entity *could* purchase any item of goods anywhere in the USA. They don't and won't. It is also no use saying that the USA dollar *should* mean the same thing to each and every entity in the USA; the fact is, it doesn't and it never will. *Further, the meaning of a dollar to each entity changes in different ways through time.* On the other hand, unless the standards are changed by decree, the metre and kilogram will always mean the same thing to every entity in the USA (and elsewhere too).

Even within an overall average condition of zero inflation in a country, prices of many different commodities would be changing (some significantly) in different directions and at different rates. These changes would be affecting different entities in different ways. A perfect price index is purely a personal concept and is applicable only to one entity. Thus, changes in wealth, when prices of commodities change in a non-proportional manner (and this is the way they *always* change), are purely personal measurements. As Sterling says about this matter, 'Any attempt to generalise is prone to a wide margin of error'.[17] (This writer argues that we do not have to worry about calculating an index for each entity in order to get the correct theoretical results. We merely need to account for individual, specific changes in those prices that concern each entity. This procedure is easier and more accurate in practice – and it is being practised.)

In support of his 'unit of measurement' statements (above) Moonitz said this:

> 'A sum of US $1,000 will buy $1,000 of clothes, shoes, coal, limestone, oil, hammers, saws, advertising space, etc., in any combination we choose, provided the total does not, of course, exceed $1,000. Furthermore, this power to buy goods and services is available in New York or Chicago, San Francisco or Fargo, and it makes no difference who holds the $1,000, where they got it, how they got it, or what they intended, at some time in the past, to do with the money. Money is *generalized* purchasing-power.'[18]

This is not correct. The power to buy those goods varies from city to city in the USA, just as the purchasing power of a sum of money will vary from city to city in almost any country. (In some places, prices of identical commodities even vary significantly between working-class suburbs and top executive suburbs in the one city.) The following USA Labor Department figures taken from the *Wall Street Journal* of March 17, 1969 substantiate this point.[19] They show 'how much it costs an urban family of four to live' in 1967 'for three different standards of living':

Metropolitan Area	*Lower Budget* $	*Moderate Budget* $	*Higher Budget* $
Total USA (*the 'general average'*)	5915	9076	13050
Boston	6251	9973	14568
New York	6021	9977	14868
Philadelphia	5898	9079	13131
Pittsburgh	5841	8764	12551
Chicago	6104	9334	13325
Cleveland	5915	9262	12997
Detroit	5873	8981	12911
Minn-St. Paul	6058	9399	13348
St. Louis	6002	9140	12813
Atlanta	5597	8328	11846
Dallas	5607	8345	12157
Washington DC	6133	9273	13419
San Francisco	6571	9774	14079
Denver	5905	9080	13011
Los Angeles	6305	9326	13645

The 'purchasing power' of the dollar *does* vary from place to place, and significantly so in some cases. It is *not* 'generalized'. The purchasing power of the dollar is even different for two people living side by side and for two companies trading side by side in New York City. They have different spending patterns.

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[16] A. A. Alchian and W. R. Allen, *University Economics* (Belmont Wadsworth Publishing Co. Inc. 1964), p. 248.

[17] Robert R. Sterling, *Theory of the Measurement of Enterprise Income* (Lawrence: The University Press of Kansas, 1970), p. 338.

[18] Op. cit., pp. 469–470.

[19] 'Government Gears Index of Family Costs to Three Separate Standards of Living'. No doubt later figures are available.

Professor Chambers bases his 'unit of measurement' ideas on invalid assumptions similar to those of Professor Moonitz. He states:

> 'From the viewpoint of the market, a given sum of money has the same significance no matter who tenders it or who receives it. Its significance subsists in the fact that it *can* be offered in exchange for *any* collection of goods desired by any holder up to the amount he holds; it represents command over marketed goods and services generally, or general purchasing power.'[20]

The 'market' does not have a viewpoint. The individual managers of entities operating in the market have viewpoints and these differ one from the other depending on their individual needs, value systems, etc. – in the way already mentioned above. Further, it is no use stating that a given sum of money 'can' be offered in exchange for 'any' collection of goods when individuals in the real world do not in fact have this sort of ability. They all have horizons beyond which they cannot see (nor do many want to). But Professor Chambers actually says (above), 'any collection of goods *desired by any holder up to the amount* [*of money*] *he holds*'. The goods 'desired by any holder' limits the range of goods for each individual to a considerable degree – and to a different degree in each case. The result is not '*general* purchasing power' but '*individual* purchasing power'. This seems to be admitted by Professor Chambers for in the very next paragraph of his book he goes on to say:

> 'Men seek to have stocks of money adequate to meet *their* daily demands for goods, as a precaution against unforseen events, including the possibility of taking advantage of relative changes in prices of the kinds of goods *they* want.'[21]

As no unit of measurement based on general purchasing power can exist at a point of time and through time with common meaning to all people, it would be sheer fantasy to decree that an overall unit of measurement *does* exist, i.e., in the way that metres and kilograms exist as common, standard, observable units of measurement. We would have a tremendous problem solved if we really did have a standard unit of measurement for accounting, but we don't.

It would be terribly wrong to prescribe a model of accounting based on the fiction that general purchasing power constitutes a 'standard unit of measurement'. 'Standard units of measurement' are precise things that can be checked by all (like the measure of a metre in Paris). An examination of the way various specific indexes fluctuate widely around their average movement shows that general purchasing power can not even *approximate* a 'standard unit of measurement' to many or most entities. Any attempt to improve conventional accounting by an additional invalid convention can only result in accounting getting further away from reality.

2. 'Accounting for Inflation' and 'Accounting for the Changing Value of Money'

Much of what was said in the previous section could be said here too (but it won't be). This section is included because several people have argued that we should be 'accounting for inflation' or 'accounting for the changing value of money' without actually mentioning anything about 'a unit of measurement'. Exposure Draft ED8 issued on the 17 January, 1973, by the Accounting Standards Steering Committee[22] is typical. In paragraph 8 we are told that 'the method proposed in this Statement shows the effects on annual accounts *of inflation*'; and in paragraph 10 we are told the purposes of the Statement is 'to measure *changes in the value of money*'.[23]

Maybe the 'unit of measurement' arguments are just sophisticated extensions of the accounting 'for inflation' and 'for the changing value of money' arguments. The first quotation from Professor Moonitz on page 142 above suggests this.

Although there are various economic theories about pure inflation being caused by increases in the overall supply of money, about demand-pull inflation, and about cost-push inflation, etc., the term 'inflation' has come to be used in direct association with increases in the Consumer Price Index and similar indexes. These indexes are averages based on many sorts of prices, and these prices change for a variety of reasons. Who is to say just why individual prices relevant to individual entities vary widely around some general index average?

Advocates of accounting 'for inflation' and 'for the changing value of money' argue for the use of one general purchasing power index (usually the reciprocal of the value of money or a surrogate thereof) in their accounting reform methods. But how can we account 'for inflation' using just one price index series when inflation affects every entity in a different way? And how can we use just one index to account for *the* 'changing value of money' when money means something different to every entity, especially through time. We can speak of the changing value of money from a national viewpoint, but not from an individual entity viewpoint.

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[20] Op. cit., p. 70. Emphasis added.

[21] Ibid. Emphasis added.

[22] Accounting Standards Steering Committee, *Proposed Statement of Standard Accounting Practice – Accounting for Changes in the Purchasing Power of Money* (Exposure Draft ED8) (London: The Institute of Chartered Accountants in England and Wales, 17 January, 1973).

[23] Ibid.

> 'If we are to measure changes in *the value of money* by examining changes in the prices of particular goods and services, we have to choose the goods and services and the weight which we shall attach to each. It is clear, therefore, that the conclusions which we draw as to movements in the purchasing power of money depend on the choice of data. The importance of a given index number may be quite different to different individuals. To a poor man a rise in the index number due to a rise in the price of tea and sugar is probably much more important than it would be to a rich man, while a rise in the number due to the price of Rolls-Royce cars means nothing to the poor man. *Can an index be framed which will give the right significance to all commodities for all people? Clearly not – the importance of price changes depends on how you spend your money.*'[24]

> 'The meaningfulness of any index varies inversely with the degree of deviation from the assumed pattern of purchases. The pattern is unlikely to fit *any* particular person perfectly, *and it may vary widely*. The consumer price index includes meat and milk which have little relevance to a vegetarian or to a playboy who consumes wine, women, and song.'[25]

This discussion is not merely highlighting a practical difficulty in constructing a suitable general index series to show the effects of 'inflation' on the 'purchasing power of money'. It has been demonstrated that no matter how carefully we go about this task the result will not depict the effects of price changes as they affect *any one entity* in a nation. As the Assistant Government Statistician for New Zealand said in 1969:

> 'The New Zealand Consumers' Price Index, for example, is based on the average consumption expenditure pattern for all persons living in urban households whose composition is broadly "family" in nature. The CPI does not claim to measure the changing relative level of consumer prices paid by, say, a merchant seaman.
>
> '*Before using an official or ad hoc price index for price level accounting, therefore, the first question that needs to be answered is: is the index appropriate for the proposed application*, . . .?'[26]

This question gets to the crux of the matter. What are we trying to do with these accounting reports? What is the objective of the whole exercise? Surely it isn't merely to 'account for inflation' or to 'account for the changing value of money'. Surely we should be trying to account for entities of all kinds (people, firms, companies, organisations, etc.) and their specific and different price changes in order to assist them and their shareholders, etc. with their individual planning, decision-making, and control problems. We must face up to the fact that 'inflation' affects them all differently, and that the overall use by all entities of one general-type index will *not* assist for these purposes.[27] (More will be said about this later in this paper.)

3. 'The Standard of Comparison of Resources (Assets)'

The notion of a 'standard of comparison' is very similar to that of a 'unit of measurement' (already discussed above). With one, the emphasis is on 'measuring'; it is on 'comparing' with the other. It is included here as a third reason for using general purchasing power in accounting reform because it introduces this new objective of using general purchasing power adjustments to 'make *comparisons of resources*'. In a recent paper Mr. Rosenfield of the staff of the Accounting Research Division of the American Institute of Certified Public Accountants argued for this 'standard of comparison' for the purpose of comparing resources. He wrote:

> 'General price-level restatement addresses the question of *the standard* that should be used in accounting *to compare diverse resources* . . . . Individuals or enterprises often wish to *compare collections of resources* . . . Money is used as the *standard of comparison* in more specialised economies . . . Money is used as the standard because it is accepted widely in exchange for other resources and can therefore be readily related to them. But money has a defect that makes it less than ideal as a standard: the general purchasing power of money – its command over goods and services in general – is notoriously fickle. An increase in money may not indicate an increase in general purchasing power. General purchasing power itself is a resource that is widely prized . . . .

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[24] Ronald S. Edwards, 'The Nature and Measurement of Income' in W. T. Baxter (ed.), *Studies in Accounting* (Sydney: Law Book Co. of Australasia Pty Ltd., 1950), p. 243. Emphasis added.

[25] Robert R. Sterling, op. cit., p. 339. Emphasis added.

[26] Stephen Kuzmicich, 'An Economic Statistician's Background Comments on Changing Price Levels', an unpublished paper presented at the Victoria University of Wellington, N.Z., 1969, p. 6.

[27] At this point it might be necessary to remind some readers that any general index constructed would be an *average* of all the specific price changes in the community in question. The overall, general price movements and the individual specific price movements are related; they are not separate and unrelated things.

> *A unit of general purchasing power may be devised . . . and collections of diverse resources may be compared on their relationships to that standard.*
>
> 'General price-level restatement is the accounting process of *changing the standard used to compare diverse resources from units of money to units of general purchasing power* . . . .
>
> 'General price-level restatement does not change the relationship emphasised between resources and the standard of comparison. For example, a balance sheet prepared under present GAAP [generally accepted accounting principles] emphasises historical cost. After general price-level restatement of that balance sheet, the relationship emphasised is still historical cost, although *the standard* has been changed from units of money to units of general purchasing power.'[28]

First of all, it is necessary to point out some invalid assumptions adopted by Rosenfield. He says that money is used as a 'standard.' It is not. It is used as a means of exchange. It is not a common 'standard' to the people who use it. As has been pointed out above, it means something different from person to person. Further, even if we were to calculate a 'unit of general purchasing power', it, too, would not be a 'standard'. It would not be meaningful to any one person and therefore could not be a 'standard', i.e., in the way that 'metre' and 'kilogram' are standards.

Secondly, *general* purchasing power is *not* 'widely prized'. Nobody can feel or understand *general* purchasing power. *Specific* individual purchasing power might be prized in many cases. If there were a change tomorrow in a calculation of 'general purchasing power', caused solely by changes in prices of tobacco products, it would not affect the specific purchasing power that this writer prizes because he does not smoke.

Now let us examine this matter of comparisons *of resources*. The whole Rosenfield paper is built on his statement:

> 'Individuals or enterprises often wish to compare collections of resources. For example, a person may wish to compare his present stock of resources with his stock a year previous or with his anticipated stock a year hence. Or, he may wish to compare his resources with the resources of others.'[29]

This mentions two kinds of comparisons: (a) inter-period comparisons for the one entity, and (b) comparisons between entities in the same period. The use of general purchasing power is not suitable for either purpose.

(*a*) *Inter-period comparisons of resources for the one entity*

Rosenfield is not alone in suggesting that the restatement of resources in accordance with changes in general purchasing power will enable meaningful inter-period comparisons to be made. The Research Foundation of The Institute of Chartered Accountants in England and Wales, for example, said this:

> 'Over a period of years even a gradual fall in the value of money, will, if progressive, have significant consequences. Unless these are quantified, *comparisons of results and net assets for a number of years* fail to indicate to investors the real growth (or lack of it) in the business, and management remains ill-informed, if not uninformed, of the extent to which their policies have procured benefits or the reverse from the general effect of inflation as distinct from the circumstances inherent in the particular business or trade.'[30]

No evidence was supplied to support this statement. It is believed that no evidence could be supplied to prove that such figures would 'indicate real growth'.

The authors of Accounting Research Study No. 6[31] used the following example to support the use of a general index to facilitate the comparison of resources over time. Like Mathews,[32] this writer will use this same example to demonstrate that general index adjustments do nothing to assist such comparisons.

At three points of time three blocks of similar land (of 10, 15, and 5 acres – and in that order) were purchased for $10,000 each. At the time of each purchase the general price index stood at 100, 125, and 75 respectively. By time 4 it had risen to 200. In Table 1 the unadjusted and adjusted (to time 4 general purchasing power) costs are presented.

The authors of Accounting Research Study No. 6 went on to claim that the adjusted figures (see columns 5 and 8, Table1) show 'the cost of each parcel of land in *proper* relation to the cost of others, that is, the adjusted amounts indicate *the relative sacrifice* which the purchaser made in acquiring each parcel.'[33] However, this writer (like Mathews) claims that the purchaser is not likely to be the least bit interested in comparing his 'relative sacrifices' expressed in

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[28] Paul Rosenfield, 'The Confusion Between General Price-Level Restatement and Current Value Accounting', *The Journal of Accountancy*, October 1972, pp. 65–66. Emphasis added.

[29] Ibid., p. 65.

[30] *Accounting for Stewardship in a Period of Inflation*, op. cit., p. 6. Emphasis added.

[31] The Staff of the Accounting Research Division, *Reporting the Financial Effects of Price-Level Changes* (Accounting Research Study No. 6). (New York: American Institute of Certified Public Accountants, 1963), pp. 25–28.

[32] Op. cit., pp. 144–146.

[33] *Reporting the Financial Effects of Price-Level Changes*, op. cit., p. 26. Emphasis added.

TABLE 1

Purchase	Historical cost	General index when bought	Multiplier to adjust to time 4's general index of 200	Historical cost adjusted to time 4's G.I. of 200	No. of acres	*Costs per acre – in Year 4*	
						Historical cost	*Historical cost adjusted to G.I. of 200*
1	2	3	4	5	6	7	8
	$			$		$	$
First	10,000	100	200/100	20,000	10	1,000	2,000
Second	10,000	125	200/125	16,000	15	667	1,067
Third	10,000	75	200/75	26,667	5	2,000	5,333
Totals	$30,000			$62,667	30	$1,000	$2,089

this way. What would this tell him – and for what purposes? The purchaser would be interested in competently compiled estimates of the net present value of the land (from its intended uses – e.g., from long-term leases), and he would be interested in the land's current market price. These figures would be helpful for planning and decision making.

If, at time 4, the estimated net present value of the land is $3,500 per acre (total of $105,000 for the 30 acres), and the current market price is $3,000 per acre (total $90,000), the purchaser would be badly misled if he measured his 'sacrifice' in using or selling the different pieces of land by reference to the adjusted figures in columns 5 and 8 above. The general-index-adjusted cost of $5,333 per acre for the third purchase can only confuse him. The same applies to the other adjusted figures. They supply him with data (definitely not 'information') that is no more relevant for his decisions than the original historical costs of the land were. And how could comparisons of the net assets (of say a steel company) adjusted in this way by a general index 'indicate to investors the *real growth* (or lack of it) in the business', and how could such figures make management 'informed' – i.e., in the way claimed above by The Research Foundation of The Institute of Chartered Accountants in England and Wales?[34] In any case, how could the shareholders and management of a steel company obtain any worthwhile information from having the unallocated historical costs of its assets restated by a general index which included weights for price changes for items such as meat, bread, underwear, shoes, saws, etc.? And what sort of profit figures would inter-period comparisons of such figures produce for a steel company?

The authors of Accounting Research Study No. 6 tell us that these general-price-level adjustments enable us to compare *dollars* 'at different points of time'.[35] But once the dollars *are* invested in assets of some kind, why should our objective be to compare the general purchasing power of those *dollars*? It is meaningless to look upon stocks of resources (particularly as at past dates) as being stocks of generalised purchasing power (of *dollars*) when the purchasing power of the firm was *not* used for the purpose of buying all the goods and services included in the regimen of the general purchasing power index. What does become meaningful is specific information relating to the *assets* that *were* purchased (with those dollars).

Those who want to make inter-period comparisons of resources can best do this by comparing the *specific values* of those assets that *were* actually purchased by companies. To do this the specific values as at past dates need to be expressed in present day prices – i.e. with the aid of *an index relevant to the person making the comparison* wherever he may be situated. Table 2 demonstrates how such comparisons can be made. (The estimated net present value and current market values of the land at time 4 in the above land example are used, and time 3 figures are now introduced for this purpose.)

The valid inter-period comparison is between the figures in lines 3 and 4, Table 2, i.e. between the restated specific values for year 3 and the specific values for year 4. The general index was merely used here as *a* means of expressing past *specific* values of *assets* in current prices. There is no useful purpose in comparing the *general* purchasing power of *dollars* invested in assets over time.

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[34] *Accounting for Stewardship in a Period of Inflation*, op. cit., p. 6. Emphasis added.

[35] *Reporting the Financial Effects of Price-Level Changes*, op. cit., p. 24.

TABLE 2

Item	Net present values		Current market prices	
	Per acre	Total for 30 acres	Per acre	Total for 30 acres
	$	$	$	$
1. Specific values as at Time 3	1,800	54,000	1,500	45,000
2. Multiplier (for a user who considers the General Index is relevant for him)	200/75	200/75	200/75	200/75
3. Time 3 specific values (in line '1' above) expressed in Year 4 prices (using the multiplier in line '2')	4,800	144,000	4,000	120,000
4. Specific Values as at Time 4	3,500	105,000	3,000	90,000

Before concluding this section it should be mentioned that valid inter-period comparisons of profit figures can be made only in a way similar to that indicated above. That is, profit for each entity must be determined taking into account the specific, individual values of the assets, depreciation, costs of goods sold, etc. of each entity – for the way it actually operated and was actually situated and deployed in the period concerned. Anyone wishing to make inter-period comparisons of an entity's profit figures (calculated in this way) would need to use some index, relevant to him, to express past profits in current terms. Incidentally, like several others, this writer has always claimed that inter-period comparisons can best be carried out by the use of ratios and percentages – and not by the use of absolute figures.[36]

(b) Comparisons of resources of different entities in the same period

This is the second of the two sorts of comparisons of resources that Rosenfield said (above) would be made possible by general purchasing power restatements. As these between-entity comparisons are invalid for reasons similar to those mentioned in the preceding paragraphs, they can be dealt with fairly quickly.

Suppose that on the same day in 1960 two parcels of land were purchased for £100,000 each by two different purchasers – one in Kent and the other in Yorkshire. In any subsequent year they would be shown by each purchaser at identical figures if they were left at their historical cost, or if they were restated using the general price index for England. Yet, in 1973, the land in Yorkshire could still be a remote semi-wilderness on a moor while the land in Kent could now be on the fringe of an expanding town. What could a comparison of the identical restated *pounds* invested in these two parcels of land tell anyone? Why would anyone 'wish' to make such a comparison – and for what rational purpose?

Before producing figures for people to make comparisons of resources, accountants need to know the objectives of such comparisons. However, whatever these objectives might be, this writer cannot think of any valid reason for using unallocated historical costs adjusted by a general purchasing power index.

4. 'Maintaining the General Purchasing Power of Shareholders' Capital'

This is a fourth type of reason put forward by many who advocate the use of general purchasing power (in one way or another) in accounting and reporting reform. All of those who advocate using an index of general purchasing power for restating assets also advocate its use for restating shareholders' capital. Whether it is their main aim or not, they are advocating the maintenance of the general purchasing power of shareholders' capital – i.e., before profit can emerge.[37]

In addition to these there are many others who advocate using a general purchasing power index (e.g., a Consumer Price index) for the maintenance of shareholders' capital even though they use some other base for restating resources (assets). Edwards and Bell,[38] Chambers,[39] and the American Accounting Association[40] are typical of such reformers. They advocate the use of some other method for valuing assets. Any differences between the way in which their assets are revalued and the way in which shareholders' capital is restated (using the general-type index) are treated as holding gains and losses (or similar). (A chart showing many combinations of asset valuation methods and capital maintenance concepts forms Appendix 2 to this paper.[41]) For example, Chambers, who advocated the use of something akin to net realisable values for the valuing of assets, says:

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[36] For example, Reg S. Gynther, *Accounting for Price-Level Changes: Theory and Procedures*, op. cit., pp. 204–206.

[37] For example see L. A. Wilk, *Accounting for Inflation* (London: Sweet & Maxwell Limited, 1960).

[38] Edgar O. Edwards and Philip W. Bell, *The Theory and Measurement of Business Income* (Berkeley and Los Angeles: University of California Press, 1961).

[39] Op. cit.

> 'The maintenance of opening capital at the closing date will be effected if the measure of the opening residual equity is transformed by a general index of prices (i.e. of the purchasing power of money) to its equivalent in units of the dimension prevailing at the closing date.'[42]
>
> 'Income shall be measured by reference to the maintenance of capital, as capital is measured in the new scale.'[43]

Chambers, like the many others, definitely has the firm's shareholders in mind when he advocates using an index of consumers' goods (as his general index of prices) for the purposes of maintaining the purchasing power of shareholders' capital. As one of his two reasons he says:

> 'The role of the firm in relation to its constituents [i.e., owners, shareholders] is to provide them with gains or incomes. Whether these incomes will be devoted to consumption or to further investment, we do not know; nor, indeed, do we know what the magnitudes of those incomes will be, for the constituents may choose not to withdraw in any year the whole of the increase in the firm's residual equity [i.e., after restatement by the C.P.I.]. But insofar as any part of this increase withdrawn is to be devoted to consumption, a consumers' goods index is relevant; and insofar as any part is left in the firm or invested in other forms, the considerations of the first argument above make a consumers' goods index equally relevant.'[44]

(His other argument was that 'all production and trading operations are geared to the final objective of making available consumers' goods'.)[45]

There are several reasons why a general-type price index should *not* be used for the restating of shareholders' capital (or 'residual equity') when prices are changing. For the first of these we can do no better than quote from Rosen. He says this in the recent study he completed for the Canadian Institute of Chartered Accountants:

> 'A common argument given in favour of price-level restated reports is that financial reports eventually must account for the purchasing power of shareholders. The reasoning is that shareholders' investments are only "temporary"; in time, the shareholder will receive cash for his investment, and spend the money on consumers' goods. Thus, a consumer price index should be used to restate historic costs [or capital] – at least, for those reports to be sent to shareholders. [As some institutions are large shareholders, other people argue similarly for the use of a general price index that also includes weights for non-consumer goods.]
>
> 'The weakness of this argument is that in those companies where there is a continual turnover of shareholders, the sum paid by the shareholder is unlikely to correspond with the sum recorded in the company's accounts [whether adjusted or not]. Hence, for the objective noted it is pointless to account for the *original* investment in the company by restating all accounts for consumer purchasing power changes. The shareholder would be best advised to restate *his* investment for consumer purchasing power changes from the date he acquired the shares [i.e., in his *own* set of accounts]. The restated sum could then be compared to the current market price of his shares if he wished to see whether or not he at least maintained general purchasing power.'[46]

After all, it is from the market that he will receive the proceeds if he sells his shares; he will not receive these from the company.

But in any case, how can we use just one, overall, general index to maintain the capital of shareholders? As was pointed out earlier in this paper, every individual has a different spending pattern. Prices often vary significantly from city to city, and in any case, money means something different to each and every shareholder even if they are residing side by side in the same city. Further, many shareholders are large entities of various kinds; their 'consumption' patterns cover a wide range of items, very different in each individual case.

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[40] Committee to Prepare a Statement of Basic Accounting Theory, *A Statement of Basic Accounting Theory* (American Accounting Association, 1966) see example 2.2.

[41] This chart first appeared in this approximate form in Reg S. Gynther's 'Accounting for Changing Prices: Some Recent Thinking, Recommendations and Practice', *The Chartered Accountant in Australia*, December, 1971, pp. 12–23.

[42] 'Measurement in Accounting', op. cit., p. 58.

[43] *Accounting, Evaluation and Economic Behavior*, op. cit., p. 227.

[44] Ibid., p. 229.

[45] Ibid.

[46] Rosen, op. cit., p. 67. Emphasis added.

And for what geographical area is such a general index to be calculated? As Moonitz says, 'the assumption is made, *usually implicitly*, that we are concerned solely with a *domestic* currency and with changes in its exchange-value in the *domestic* economy'.[47] But what about the French shareholder who lives on the German border and who makes most of his purchases in Germany? And what do we do if all the shareholders in a company operating in England pack up and move to Argentina to live? Will this mean that we must now completely restate the shareholders' capital in accordance with movements in a general index for Argentina – i.e., even though the company still continues to operate in England? If the answer to this last question is 'yes', it will mean that the company would report different profits from the identical company next door that has all its shareholders residing in England! (Chambers and others are looking at shareholders as consumers; they can only consume where they reside.)

Further, what do we do in a case where most shareholders of a company are spread across most European countries, many are in Asia, and others are in the Americas? Do we calculate one overall general index (with weights for the different countries) to maintain the capital of the shareholders of such a company? If so, does this mean that we must recalculate this index each year as shares are sold from country to country (and thus changing the weights for each country)? If we follow this through to a logical conclusion we would end up calculating a general index for the whole world. After all, some people argue that money represents *general* purchasing power, and with the world 'shrinking' it is possible for an increasing number of people (maybe everyone) to use their money to purchase goods and services from all parts of the world. It is also evident that an increasing number of foreign shareholders are appearing in the share registers of companies in many countries.

In view of what has been said in the last few paragraphs, the ideal solution for those who want to 'maintain the purchasing power of shareholders' capital' in times of price changes (i.e. those who want profit to be determined only after such capital has been maintained) might be to prepare a separate set of financial statements for each and every shareholder. Only in this way could the individual value of money to each shareholder be taken into account when restating shareholders' capital. If we were to do this we could have a shareholder in Paris expecting a dividend from the profit reported to him, while a shareholder in Rio de Janeiro was lamenting the loss reported to him by the same company for the same period.

However, this writer is convinced that the ideal solution is a far more practical one.[48] It is one which has theoretical validity because of its realistic behavioural underpinnings, and it is the one which will meet the objectives of providing decision-making information to shareholders, managements and others. The ideal solution is for each entity to calculate its profit for a period after restating capital in accordance with individual movements in those specific prices which relate to the operating capacity it actually had for that period. Here 'capital' relates to the specific capital funds necessary to support the basic assets of the entity – i.e., in the form they were actually deployed during the period concerned. As these funds also include forms of long-term capital such as preference shares and debentures, profit for any period of rising prices cannot include any 'holding gains' on long-term debentures or on any other form of long-term capital. Nor can it include any of the Edwards-and-Bell-type gains (or losses) on holding non-monetary assets during periods of price changes.[49] It can be demonstrated that so-called gains of this nature can only be shed (as dividends) if the operating capacity is run down (e.g. by selling some of the basic assets) or if additional capital is raised – and that, therefore, they are not gains to the entity itself. (See Appendix 2 for such a demonstration.)

In our environment today, the roles of producing, distributing, servicing, financing, etc. are performed by entities, whether they be government departments, local government authorities, companies, partnerships, individuals, household units, clubs, associations, etc. Each shareholder or member or participant of any of these entities is a separate entity (e.g. an investing entity) in his own right. The focus is on the actions and performance of entities, and in order to evaluate the performances of each of these entities in what they are endeavouring to do, it is essential that we separate the performances of each entity from those of any member entities it may have (e.g., shareholders of a company).[50] If this separation is not made a misleading hybrid results.

In this writer's solution to the accounting-for-changing-prices problem, the focus is on each entity. Only in this way will both managers and shareholders obtain information which is relevant to their decisions about each entity. Instead of endeavouring to account for the shareholders *in* the books of the entity (i.e. by endeavouring to maintain the general purchasing power of shareholders' funds before arriving at company profits) the shareholders must do their own individual accounting (as separate entities) in their *own* books of account (at home or in their own offices, etc.). With profit calculated after maintaining capital funds needed to support the basic assets of each entity (after noting the relative specific price movements), each user of the resultant financial statements will be able to evaluate growth in each entity's profit, its resources, etc. To express past profit and asset figures in current prices for comparison purposes, each user can use the price index that be believes to be most relevant to him for this purpose – i.e., in the way outlined in Section 3 above. This is something that management might like to do as an exercise, for example, to see if increases in profits or dividends have kept pace with increases in a consumer price index.

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[47] Moonitz, op. cit., p. 470. Emphasis added.

[48] It has, for example, been employed by relatively small companies with which this writer is associated, and (except for some relatively small variations) by the (large) Philips Electrical group of companies on a world-wide basis for many years.

[49] *Edwards and Bell*, op. cit.

[50] This paragraph is adapted from a paper presented to the 18th Victoria University of Wellington (New Zealand) Advanced Accounting Seminar in August, 1969.

However, to attempt to incorporate these user indexes *into* the accounts and the financial statements of each entity can only distort the reported performance of each entity – i.e., in the operations it was actually carrying out.

If meaningful asset valuation methods are used (see previous section) in conjunction with capital restated by a *general*-type index, it results in the incorrect reporting of profit. In such cases reported profit includes 'holding gains and losses' that are of a *capital* nature to the entity, and which suffer from the serious deficiencies highlighted by Drake and Dopuch.[51]

For the reasons given in this section it is incorrect to use any sort of a general price index to restate capital contributed by shareholders. The use of such a general-type index for this purpose can only ensure that a company will not unwittingly distribute dividends to an extent that erodes the real *historic cost* of shareholder capital. This is something very different from an entity's real operating capacity capital.[52]

5. 'Accounting for Stewardship' or to Meet 'Fiduciary Accountabilities'?

In the four sections above we have examined the proposed usage of general purchasing power in accounting reform in conjunction with four reasons given for doing so. A valid reason has yet to be found. However, we have not yet examined the real reasons which underlie recent important documents issued by two professional accounting bodies, i.e., the American Institute of Certified Public Accountants' Accounting Principles Board Statement No. 3[53] and the recent Exposure Draft ED8 issued by the Accounting Standards Steering Committee in Great Britain.[54] We noticed that the former mentioned that the main difference between general price-level and historical-cost statements 'is the unit of measure'.[55] We also noticed that the latter indicates (almost as an aside) that 'the purpose is to measure changes in the value of money'.[56] However, neither document supplies its real underlying objectives for advocating the use of a 'unit of measure' or the current 'value of money'.

The Accounting Principles Board, in its Statement No. 3, says at the outset that 'general price-level financial statements *should* prove useful to investors, creditors, management, employees, government officials, and others who are concerned with the economic affairs of business enterprises',[57] but no attempt is made to demonstrate just how and in what way these users 'should' be assisted by such restatements. The first footnote in this Accounting Principles Board Statement No. 3 makes this writer believe that it merely adopts the main recommendations of the American Institute of Certified Public Accountants' Accounting Research Study No. 6.[58] This seems to complete a circle because the constraining directions given to the authors of Accounting Research Study No. 6 came from the Accounting Principles Board itself. The authors were merely told to 'set up a research project to study the problem' caused by 'fluctuations in *the value of the dollar*' and 'to prepare a report in which recommendations are made for the disclosure of the effect of *price-level changes* upon the financial statements'.[59] In other words, the Accounting Principles Board assumed at the outset (in 1961) that all adjustments should be by one general purchasing power index. Their real reasons were not supplied.

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[51] David F. Drake and Nicholas Dopuch, 'On the Case for Dichotomizing Income', *Journal of Accounting Research*, Autumn 1965, pp. 192–205.

[52] Edwards and Bell said something like this: op. cit., p. 22 – and then proceeded to advocate a method of accounting for changing prices which did exactly that on the capital side!

[53] *Financial Statements Restated for General Price-Level Changes*, op. cit.

[54] *Proposed Statement of Standard Accounting Practice – Accounting for Changes in the Purchasing Power of Money*, op. cit.

[55] Op. cit., p. 3.

[56] Op. cit., paragraph 10.

[57] Op. cit., p. 4. Emphasis added.

[58] *Reporting the Financial Effects of Price-Level Changes*, op. cit., p. 2.

In Great Britain, the Accounting Standards Steering Committee's recent Exposure Draft ED8 also does not supply any real objective. In paragraph 1 it states this:

> 'The purpose of this Statement is to establish a standard method for calculating the effect of changes in the purchasing power of money *on conventional historical cost accounts.* It does not suggest the abandonment of the historical convention, but simply that historical costs should be converted from an aggregation of historical pounds of many different purchasing powers into approximate figures of current general purchasing power . . .'[60]

But why? Presumably for the same reasons (?) that have existed for the issuing of 'conventional historical-cost accounts'.

To this writer it is incredible that the 'programme' of this Accounting Standards Steering Committee only lists in 19th place for some 'future' action, a study entitled, 'Fundamental Objects and Principles of Periodic Financial Statements'.[61] How can this committee issue any 'Statement 'or 'Exposure Draft' on any aspect of financial statements *before* establishing what these 'objects and principles of periodic financial statements' are? Surely this projected 'objects' study should not be in 19th place. It should have been the first one undertaken so that all the statements that followed could aim at the 'objects' decided upon, and so that they could comply with the underlying 'principles'. As it is, the 'Statements of Standard Accounting Practice' and 'Exposure Drafts' (like ED8) can only float about aimlessly in mid-air, and quite likely in different directions.

As the contents of Exposure Draft ED8 are fairly consistent with the report of The Research Foundation of The Institute of Chartered Accountants in England and Wales (which report preceded it), and as that report was titled, 'Accounting for *Stewardship* in a Period of Inflation',[62] it could be assumed that the objective of Exposure Draft ED8 relates to 'stewardship'. This assumption is supported by the following extract from an official 'Statement' issued by The Institute of Chartered Accountants in England and Wales in 1952:

> 'The primary purpose of the annual accounts of a business is to present information to the proprietors, showing how their funds have been utilised and the profits derived from such use.'[63]

This is a common version of the so-called stewardship objective of accounting.

Paul Grady, when compiling his inventory of accounting principles for the American Institute of Certified Public Accountants said something similar early in his study – i.e., after studying all of the past pronouncements, etc. of that Institute:

> 'The separation of ownership from management of the business entity is a primary factor in imposing on the entity the fiduciary accountabilities to its shareholders. The summary of generally accepted accounting principles later set forth is classified in relation to these fiduciary accountabilities.'[64]

If these similar matters, 'stewardship' and 'fiduciary accountabilities', are the main objectives of the two documents that are now being discussed, they should have been defined in some detail. The Research Foundation of The Institute of Chartered Accountants in England and Wales in its *Accounting for Stewardship in a Period of Inflation*[65] did not define what is meant by 'stewardship', nor did it explain how its general price-level recommendations would improve stewardship.

Further, if the objectives of issuing financial statements were the *narrow* versions of 'stewardship' and 'fiduciary accountabilities' that are often espoused, they would merely relate to reporting on what managers and directors have done with the funds that were entrusted to them by shareholders and others. As Edey says, this calls for nothing more than a summarised cash-flow statement, a list of liabilities incurred, a list of non-monetary assets purchased and still on hand, and a list of monetary assets possessed on balance day. There would be no need for any attempt to value the non-monetary assets, nor would this narrow version of 'stewardship' call for an attempt to determine a profit figure.[66] As there is no need to put a value on assets, there would be no need to consider revaluations or restatements using a general (or any other) index.

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[59] Ibid., p. 1. Emphasis added.

[60] Op. cit., paragraph 1. Emphasis added.

[61] Ibid., see back cover.

[62] Op. cit.

[63] The Institute of Chartered Accountants in England and Wales, Statement N15 on 'Accounting in Relation to Changes in the Purchasing Power of Money', 30th May, 1952, paragraph 1.

[64] Paul Grady, *Inventory of Generally Accepted Accounting Principles for Business Enterprises* (Accounting Research Study No. 7) (New York: American Institute of Certified Public Accountants, 1965), p. 26.

[65] Op. cit.

[66] Harold Edey, 'The Nature of Profit', *Accounting and Business Research*, Winter, 1970, p. 54.

Probably 'stewardship' and 'fiduciary accountabilities' are seen by most to go further than the above narrow interpretation. (For example, see the above extract from the 1952 Statement issued by The Institute of Chartered Accountants in England and Wales). This slightly wider view sees the necessity to produce an historical-cost balance sheet which includes the unallocated costs of non-monetary assets along with the monetary items, as well as a profit figure determined after deducting allocations from many past expenditures. However, this writer has never been able to see how financial reports built on mere arbitrary allocations[67] of past payments of funds to purchase assets (and the resultant balances of unallocated costs) can fill any meaningful stewardship role. Directors have much latitude in determining the ways in which they make allocations (many of which can be large) of past expenditures.[68] This is no real way to report on the honesty with which funds invested in a company are being managed. It follows that the restatement of such allocations and the resultant unallocated historical-cost balances of non-monetary assets (i.e., by a general purchasing power index) will *not* improve the possibilities of attaining any such stewardship objective. Such restatements will inherit all the deficiencies of historical-cost accounting. From a pure stewardship viewpoint such restatements might even hide or disguise some uses of *funds*.

Some might argue that a true interpretation of 'stewardship' and 'fiduciary accountabilities' would require the production of financial statements (for shareholders and other suppliers of funds) showing the *efficiency* with which the funds have been managed by the directors, and supplying information on how the employment of funds is expected to affect *the future* of the entity. Reporting of this kind calls for something far more than the mere general index restatements of conventional historic-cost financial statements. It requires the reporting of values of resources actually deployed, with such values reflecting as much of the future as is possible. (The current value of *money* invested in those resources is useless for this purpose. See Section 3 above). It also calls for periodic profit to be determined taking into account (*a*) the resources valued in this way, and (*b*) capital maintained to support the operating capacity of the specific basic assets of the entity. (See Section 4 above).

Therefore, if the two professional bodies have a narrow, a somewhat wider, or a very wide view of 'stewardship' or 'fiduciary accountabilities' in mind as the main objective of their recommendations for the restatement of conventional historical-cost accounts (to include the effect of changes in the general purchasing power of money), they will not achieve their objective. General index adjustments are not valid for this purpose.

6. Concluding Remarks

The purpose of this paper was to analyse critically the different reasons given by those who advocate the use of general purchasing power in their proposals for accounting and/or reporting reform – i.e., to cope with the inadequacies of conventional historical-cost accounting in times of rising prices. The different reasons found in the literature were classified under five headings and they were examined in turn; all were found to be invalid. The five headings were:

1. A 'Unit of Measurement',
2. 'Accounting for Inflation' and 'Accounting for the Changing Value of Money',
3. 'The Standard of Comparison of Resources (Assets),'
4. 'Maintaining the General Purchasing Power of Shareholders' Capital', and
5. 'Accounting for Stewardship' or to fulfil 'Fiduciary Accountabilities'.

General purchasing power changes should not be used in any way in such accounting and/or reporting reform. They do not result in the production of information useful to internal or external people for decision or control purposes. It is hoped that the professional bodies in the USA and Great Britain will give much further thought to this matter before directing their members to implement accounting or reporting involving changes in general purchasing power. Rosen, in the study he carried out for the Canadian Institute of Chartered Accountants, also 'urged' that this Institute '*not* pursue this avenue in future research and pronouncements'.[69]

Although this paper is a 'destructive' one, the writer does have his own 'solution' to the problem of accounting in times of changing (i.e., rising and falling) prices. Indications of the theoretical nature of this 'solution' were given in Sections 3 and 4 above and will be the subject of a fourth paper. In the meantime, his book[70] gives a reasonable exposition of what he advocates. This 'solution' is being applied in a fully integrated fashion in a relatively small way in

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[67] See Arthur L. Thomas, *The Allocation Problem in Financial Accounting Theory* (Studies in Accounting Research No. 3) (American Accounting Association, 1969). Thomas claims, with much force, that *all allocations* are arbitrary no matter how much thought is put into them.

[68] Ibid.

[69] Rosen, *Current Value Accounting and Price-Level Restatements*, op. cit., p. 8 and Chapter 4.

[70] R. S. Gynther, *Accounting for Price-Level Changes: Theory and Procedures*, op. cit.

Australia. The somewhat similar Philips Electrical system shows that it can be applied in large entities.

Lastly, despite what might have been said elsewhere (and by this writer too), the words, 'It is better to be approximately correct than precisely wrong' do not justify the use of an index of general purchasing power. The use of such an index will produce financial statements that are not even *approximately* correct in most cases. Prices that affect individual companies (and specific indexes) fluctuate *widely* around and from the general index 'average'. The whole general purchasing power approach needs to be shelved and the matter approached from a different direction.

Acknowledgement. An earlier version of this paper was presented at the National Conference of the Association of University Teachers of Accounting in Edinburgh in April, 1973, when the author was a Simon Visiting Professor at the University of Manchester.

Appendix 1

The Treatment of Borrowing When Accounting For Changing Prices

The purpose of this appendix is to demonstrate that the inclusion in profits of so-called holding gains on long-term borrowings (and other forms of long-term capital), i.e. when prices are rising, results in the overstatement of profits of the entity concerned. It will be shown that these 'holding gains' can only be shed as dividends (*a*) if the operating capacity is run down (e.g. by selling off some of the basic assets) or (*b*) if additional capital is raised – and that, therefore, they are not gains to the entity itself.

This is a matter to which this writer devoted much space in Chapter 11 of his book,[1] one that Kirkman was concerned about in a recent paper,[2] that Parker and Harcourt recognised in their book,[3] and that Mathews[4] and others have endeavoured to make clear in their writings and examples. Further it is not a minor matter. Cutler and Westwick have clearly demonstrated that these so-called gains on long-term borrowings would be one of the largest adjustments to profit in absolute terms – i.e. if included in a system of accounting for changing prices.[5]

An example

Let us suppose that a company owns land which it rents to farmers, that it distributes all of its profits to its shareholders, and that tax is paid immediately. At the end of its first year of operations the following financial statements were prepared:

Profit and Loss Statement for Year 1

Net rents received from farmers	40
Less Interest on Debentures (say 10%)	10
	30
Less Tax (say 50%)	15
= Net Profit	$15

Balance Sheet at End of Year 1

Ordinary Share Capital	100
Debentures (20 year Term)	100
= Total Funds Employed	$200
Represented by:	
Land rented to farmers	$200

Let us assume that early in Year 2 the prices of all commodities and services doubled overnight![6] (That prices might only increase by a few per cent in the real world is granted. The doubling of prices helps to establish a point; any lesser increases merely involve a matter of degree).

The financial statements for Year 2 are prepared with two columns. Column 1 includes holding gains on the Debenture capital (i.e. in the way recommended by many people) while Column 2 does not.

Profit and Loss Statement for Year 2

	1 *Including holding on Debentures*	2 *With no holding gains on Debentures*
Net rents received from farmers	80	80
Less Interest on Debentures (still at 10% on amounts received from Debenture holders)	10	10
	70	70
Less Tax (50%)	35	35
= Net operating profit	35	35
Plus Holding Gain on Long-Term Borrowings (When prices increased by 100%)	100	NIL
= Net Profit	$135	$35

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[1] R. S. Gynther, *Accounting for Price-Level Changes: Theory and Procedures* (Oxford: Pergamon Press Ltd., 1966).

[2] P. R. A. Kirkman, 'A Weakness of ED8? Long-term Debt and Distributable Profits', *The Accountant*, April 19th, 1973.

[3] R. H. Parker and G. C. Harcourt, *Readings in the Concept and Measurement of Income* (Cambridge: Cambridge University Press, 1969). See footnote p. 24.

[4] R. L. Mathews, 'Income, Price Changes and the Valuation Controversy in Accounting', *Accounting Review*, July, 1968.

[5] R. S. Cutler and C. A. Westwick, 'The Impact of Inflation Accounting on the Stock Market', *Accountancy*, March, 1973, pp. 15–24. Incidentally, the fact that the stock market has not responded to the changes in company profits that they estimated in this paper, could indicate that interested parties consider general price-level adjusted information to be irrelevant.

[6] By assuming that *all* prices double we obviate clouding the matter at hand with a debate of a different (but related) matter – i.e. the treatment of variations between movements in specific prices of non-monetary items and in prices of all goods in general.

Balance Sheet at End of Year 2

Ordinary Share Capital	100	100
Capital Maintenance Adjustment	100	200
Undistributed Profits (After the Distribution of the Operating Profit of $35)	100	NIL
= Total Equity Interest	300	300
Debentures	100	100
= Total Funds Employed	$400	$400
Represented by:		
Land rented to farmers	$400	$400

(The Capital Maintenance Adjustment item of $100 in the Column 1 Balance Sheet above can be calculated in two ways: (i) As the focus here is on maintaining the general purchasing power of *shareholders' funds* (only), the adjustment equals the rate of price change multiplied by the opening balance of shareholders' funds; i.e. 100% of $100. (ii) The second way looks at the effects of the doubling of prices as if these were actually included in the accounting system; then there would be two entries:

(a) Land *Dr.* $200
Capital Maintenance
Adjustment *Cr.* $200
(To revalue the Land)

(b) Capital Maintenance
Adjustment *Dr.* $100
Holding Gain on Long-
Term Borrowings *Cr.* $100

The *Net* Capital Maintenance Adjustment is a credit of $100.

The Column 2 presentation includes only the first of these two entries, i.e. from revaluing the land. The Capital Maintenance Adjustment A/c therefore has a balance of $200.

Now let us look at some of the aspects of the Year 2 financial statements. The Column 1 Balance Sheet shows 'Undistributed Profits' of $100 (a result of creating a holding gain on the long-term borrowings). *As the only way in which these 'profits' could be distributed would be either to (a) sell one-quarter of the land, or (b) raise additional long-term capital funds of $100, they cannot be profits to the company itself.* To include this amount of $100 in 'profits' in the Year 2 Profit and Loss Statement and Balance Sheet can only mislead. The $100 is needed to maintain the *same* level of business. (Incidentally, short-term borrowings of $100 would need to be replaced constantly, and therefore would really be akin to raising additional capital of some form.)

The fact of the matter is, that on the morning after the night in which all prices doubled, the company possessed the same quantity of land. It had not increased in size. The company itself was no better off and no worse off. It now required *capital* funds of $400 (in the new current prices) to continue doing what it was doing. The second column above shows the correct results and position of the entity to which the shareholders subscribed their money.

When prices rise, 'profits' or 'gains' cannot be made from holding funds needed to support the basic assets of a company. It does not matter whether those funds come from ordinary shareholders, preference shareholders, debenture holders, or were raised from an issue of convertible notes. If it is ever decided to reduce the size of the operations of a company, long-term borrowings can be repaid at due date (without replacement) and/or refunds of shareholder capital can be made. In the meantime it gives a false picture to record 'holding gains' on *any* form of long-term funds needed to support basic assets.

Many readers will now protest, 'But the shareholders are better off'. And so they probably are. An inspection of the second column above shows that after-tax profits have more than doubled. They have increased from $15 in Year 1 to $35 in Year 2. Further; the second column in the above Balance Sheet shows that shareholders have a three quarter stake in the company's assets at the end of Year 2, compared with only a half stake at the end of Year 1. Therefore, all else being equal, the stock exchange prices of their shares will more than double. As shareholders are separate entities (they are investing entities in our society), they should have their own accounting systems separate from the company's accounting system, and in these they should revalue the shares they own after comparing the relevant share prices at the stock exchange with prices they paid for them.

To endeavour to account for shareholders within the company's accounting system produces a confused hybrid from which misleading financial reports can flow. It produces a double-counting effect. 'Profits' that are not profits to the company itself are included in the company's financial statements, while share prices at the stock exchange automatically reflect the gains that shareholders (as separate entities) make at the expense of debenture holders.

It is believed that more people would quickly become aware of this 'double counting' if the taxation authorities decided to include such 'holding gains' (on company long-term borrowings) in the profit figure to be taxed – i.e. as well as taxing capital gains on share transactions.

APPENDIX 2

Main possible combinations of Net Asset Valuation Methods and Capital Maintenance Ideas with some known advocates for some of the combinations*

Capital Maintenance Ideas	*Net Asset Valuation Methods*						
	1 *Historical costs*	2 *Historical costs* × *General index*	3 *Historical costs* × *Consumer price index*	4 *Historical costs* × *Investment price index*	5 *Current market buying prices (Current replacement costs)*	6 *Net present values*	7 *Current market selling prices (Net realisable values, C.C.Es.)*
A. Money Capital	Conventional Historical-cost accounting Yuji Ijiri (a)						
B. General Purchasing Power		Accounting Principles Board of American Institute of Certified Public Accountants (b)			American Accounting Assn's Committee to prepare a statement of Basic Accounting Theory (c)	American Accounting Assn's Committee on Concepts and Standards – long lived assets (as an ideal concept) (7)	B. L. Branford (e)
C. Consumer Purchasing Power			Accounting Standards Steering Committee (f)		Edwards & Bell (g)		Raymond J. Chambers (h) Robert R. Sterling (i)
D. Investment Purchasing Power				Eldon S. Hendrikson (when a single index is to be used) (j)	Eldon S. Hendrikson (his main idea for use in practice) (k)	Eldon S. Hendrikson (as an ideal concept in some cases) (l)	
E. Operating Capacity (mainly based on current replacement costs)					Russell L. Mathews (m) Reg S. Gynther (for most practical applications) (n)	Reg S. Gynther (as an ideal concept)	Reg S. Gynther (for some practical applications as a surrogate for net present values)

*This chart first appeared in this approximate form in Reg S. Gynther, 'Accounting for Changing Prices: Some Recent Thinking, Recommendations and Practice', *The Chartered Accountant in Australia*, December, 1971, pp. 12–23. An earlier version appeared in Reg S. Gynther, *Accounting for Price Changes – Theory and Practice* (Society, Bulletin No. 5) (Melbourne: Australian Society of Accountants, 1968).

References to the Listed Advocates for Some of the Combinations

(*a*) Yuri Ijiri, *The Foundations of Accounting Measurement* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967).

(*b*) Accounting Principles Board, *Financial Statements Restated for General Price-Level Changes* (Statement of the Accounting Principles Board No. 3) (New York: American Institute of Certified Public Accountants, 1969).

(*c*) Committee to Prepare a Statement of Basic Accounting Theory, *A Statement of Basic Accounting Theory* (American Accounting Association, 1966).

(*d*) American Accounting Association's Committee on Concepts and Standards – Long-Lived Assets, 'Accounting for Land, Buildings and Equipment', *Accounting Review*, July, 1964, pp. 693–699.

(*e*) B. L. Branford, 'Current Monetary Measures in Accounting', *Accounting Bulletin* (Queensland Division of the Australian Society of Accountants), November, 1968.

(*f*) Accounting Standards Steering Committee, *Proposed Statement of Standard Accounting Practice: Accounting for Changes in the Purchasing Power of Money* (Exposure Draft ED8) (London: C/o The Institute of Chartered Accountants in England and Wales, 17th January, 1973.)

(*g*) Edgar O. Edwards & Philip W. Bell, *The Theory and Measurement of Business Income*. (Berkley and Los Angeles: University of California Press, 1961).

(*h*) Raymond J. Chambers, *Accounting, Evaluation and Economic Behavior* (Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1966).

(*i*) Robert R. Sterling, *Theory of the Measurement of Enterprise Income* (Lawrence: The University Press of Kansas, 1970).

(*j*) Eldon S. Hendrikson, *Accounting Theory* Rev. Ed. (Homewood, Illinois: Richard D. Irwin, Inc., 1970) pp. 222 and 225.

(*k*) Ibid., pp. 225, 268 and 282.

(*l*) Ibid., pp. 225, 260–264, and 282.

(*m*) Russell L. Mathews, 'Income, Price Changes and the Valuation Controversy in Accounting', *Accounting Review*, July, 1968, pp. 509–516.

(*n*) R. S. Gynther, *Accounting for Price-Level Changes: Theory and Procedures* (Oxford: Pergamon Press Ltd., 1966).

Book Reviews

Costs and Potential Economies; Studies in Institutional Management in Higher Education

(OECD 1972)

The assessment of the efficiency of financial management in universities has, until recently, been a neglected area. This neglect is probably due to the nature of methods adopted for financing universities. If universities are to be effective in developing research and providing a forum for the uninhibited exchange of ideas, it is important that they should be free from political pressures. It is important that a government should be restrained from blocking a line of enquiry simply because it is inconsistent with the dogmas of a political party. The freedom of universities has been protected by establishing a 'buffer' between the government and the universities, the University Grants Committee, charged with the task of allocating to universities funds provided by the government. The UGC has not been empowered to control the uses to which universities apply their funds.

No freedoms, however, are usually judged worthy of preservation at any price. As the amount of public money required to finance the universities has increased, demands for control of its use have also increased. Some five years ago, Parliament decided that the Auditor and Comptroller General should assume responsibility for the investigation of university financial management. According to a recently published report of the Public Accounts Committee, his first tour of inspection revealed no serious shortcomings in the standards of financial management of universities. Nevertheless universities are in no position to relax. Often their financial decisions are based on primitive methods of analysis and supplies of information. They are being expected to increase student numbers significantly with less than proportionate increases in financial resources; if life is to remain tolerable the resources which they do have must be used efficiently. Moreover, it seems likely that those universities which demonstrate their ability to meet targets which imply a satisfactory level of efficiency will receive preferential treatment in the allocation of extra resources.

Against this background, my first reaction was to welcome a study such as *Costs and Potential Economies*, intended to improve techniques of financial management in universities. The study was sponsored by the

Centre for Educational Research and Innovation, a foundation of OECD, and undertaken by a team from the University of Bradford, led by J. A. Bottomley, Professor of Economics. The aim of the study is to measure the cost of teaching students in different courses and to discover the scope for economies.

The study begins promisingly by insisting that the concept of cost may be defined usefully only in relation to some specified purpose for which the computation of cost is required. An understanding of this point is important if we are to deal effectively with the major difficulty of financial analysis in universities, the difficulty that arises because virtually all resources contribute jointly to several 'outputs'. It is the normal practice for university teachers to divide their time between teaching and research (and administration which is an input to teaching and research). If a university teacher spends an hour reading in the library, for example, he may well be developing his undergraduate teaching, his postgraduate teaching and several research projects at the same time. It is not a simple matter to estimate the cost of each activity.

After the promising beginning, however, the logic of the analysis rapidly becomes murky. We are told that the uses of cost figures are broadly twofold, 'planning' uses and 'accounting' uses. The concept of cost for planning uses seems clear enough. If a university wishes to assess the worthwhileness of some expansion or contraction of activities, it should estimate the change in expenditure which will result and compare this number with the associated change in benefits: it should be concerned with avoidable costs and opportunity costs. The study seems confused in its application of the concept however. It argues that the total salaries of extra staff required for an expansion of student numbers should be regarded as a cost of such expansion even though some of the extra staff time will be devoted to research on the grounds that the expansion will inevitably cause the whole extra cost to be incurred. It may be admitted that an apportionment of staff costs on a time basis would have little significance; but it seems equally inappropriate to relate the total costs to the benefits of teaching alone. The only reasonable approach would seem to be to relate the joint benefits from extra teaching and research to the extra cost involved. The treatment of accommodation costs in the study also seems unsatisfactory. Too little attention is given to the effect on opportunity cost of the specific nature of some buildings and the existence of spare capacity in others. It is argued that for some purposes the cost of accommodation to the university should be regarded as different from the cost to the department which uses it – an argument which is not developed and seems, indeed, impossible to sustain.

The concept of cost for 'accounting' uses seems utterly baffling. Accounting hardly seems to be significant as an end in itself although the part of the study concerned with the calculation of accounting costs might seem to suggest that it is. The team has undertaken cost allocations worthy of the traditional excesses of some cost accountants. They claim that the allocations are 'equitable', though they do not say for whom they are equitable or how we may judge equity. They allocate staff costs to various activities on a time basis; and they allocate accommodation costs first to rooms on the basis of square feet occupied and then to activities on the basis of the actual time taken up by each one. If one room happens by chance to be used only by two courses for one hour per week each, each course would be 'charged' with one half of the total allocated cost for the room. The least used and presumably least convenient rooms would be regarded as most expensive and departments would have an incentive to shift their teaching to the rooms most in demand – a strange result indeed. The end product of this analysis is a cost per student per course.

We are not told the exact nature of the uses to which the 'accounting' costs are to be put and it is hard to think of any uses to which they are appropriate. They would not be suitable for communication to the University Grants Committee as a basis for deciding which courses should be encouraged to expand. For such a purpose, the UGC would wish to know the extra costs which would be incurred for a given expansion of numbers, an avoidable cost concept, perhaps supplemented by estimates of social costs and benefits. They would be no more appropriate for control purposes. Financial information for control must surely be drawn up on the same principles as the financial information used in taking the decisions, the implementation of which is to be controlled. Control would involve recording expected cost levels for the activities selected and comparing them with actual cost levels.

Subsequently, the study turns to the development of models for financial planning. It is more fruitful in this endeavour. It gives methods for estimating the potentiality for cost savings (or, strictly, the expansion of activities at a reduced average cost) as a result of altering the size of lecture and tutorial groups, the proportion of staff time devoted to teaching, the intensity of use of accommodation (which depends on the length of the teaching week and year), the level of technical support and so on. The problem of the use of resources for joint outputs is still not dealt with satisfactorily, however. In my view, research should be devoted to the development of simulation models which will predict the various possible combinations of output (mainly students on various courses and research time) given various levels of expenditures on resources and with the facility to vary key parameters such as the time spent by staff on teaching. It is to be hoped that the publication of *Costs and Potential Economies* will provide a stimulus to the development of further work in this area.

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Contributors to Accounting and Business Research

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The Objectives of Published Accounting Reports

Bryan Carsberg, Anthony Hope and R. W. Scapens

> 'Cheshire-Puss,' she began rather timidly, '... would you tell me, please, which way I ought to go from here?'
>
> 'That depends a good deal on where you want to get to,' said the Cat.
>
> 'I don't care where ...,' said Alice.
>
> 'Then it doesn't matter which way you go,' said the Cat.
>
> '... so long as I get *somewhere*,' Alice added as an explanation.
>
> 'Oh, you're sure to do that,' said the Cat, 'if you only walk long enough.'

Published accounting reports are a means by which an undertaking communicates information about its financial affairs to interested individuals or groups of individuals. The reports normally comprise the historical balance sheet and profit and loss account but may include other statements, such as flow-of-funds statements and forecasts of profits or dividends. The literature of accounting has, for many years, presented divergent opinions about the best methods of preparing such reports. Interest in this question is particularly intense at the present time. It has been kindled by the publicity associated with a few notable cases which have demonstrated the indeterminate state of both accounting theory and practice. These cases have shown that different accountants may interpret given data in ways that lead them to prepare significantly different accounting reports; and such differences may arise without the breach of rules of practice which are generally accepted by accountants.

The recognition of the indeterminate nature of accounting practice led to what may, perhaps, be called a crisis of confidence in accounting. It suggested the urgent need to secure greater uniformity in practice – to ensure, as far as possible, that different accountants, presented with given data, would produce similar financial statements. Many have thought that uniformity is a worthwhile goal in itself, at least as a temporary measure which would overcome the crisis of confidence. The securing of greater uniformity may be a worthwhile intermediate goal, but it is not a satisfactory goal for the longer term. Usefulness for specified purposes is the criterion by which the merits of accounting practice must finally be judged. The crisis is important mainly for its demonstration of the urgent need to reach agreement on what constitutes 'best', i.e., most useful practice.

The accounting profession in Britain has responded to the crisis of confidence by establishing the Accounting Standards Steering Committee, a committee charged with the task of recommending standard practices in order to secure greater uniformity. This brief has not been easy to interpret. The Committee has explained that it sees no possibility of reaching definite conclusions on best practice in the near future. It has, however, sought to promote standards which, in the opinion of its members, represent 'good' practice even if they cannot be shown to be 'best' practice. The Committee's procedure is to publish its suggestions for the standardization of practice as exposure drafts, to test informed opinion on their acceptability. If the proposals appear to be acceptable, they may be endorsed by the sponsoring bodies and be given the status of Standard Accounting Practices. Members of the sponsoring bodies who do not comply with SAPs face the possibility of disciplinary action. Several of the proposals of the Committee have proved controversial and have not gained sufficiently widespread acceptance to warrant implementation. Many of the proposals have provoked dissenting statements and counter-proposals. For example, the suggestion that changing price levels should be reflected in adjustments to financial statements based on an index of general purchasing power has attracted some support; it has also attracted a number of arguments for ignoring changes in price levels or for using various alternative forms of adjustment based on the changing replacement costs of the specific resources used in an undertaking.

Anyone who has tried to distinguish the relative merits of alternative accounting methods must have become aware that no complete theoretical framework is available for making the choice or, indeed, for deciding whether any method is worthwhile. The purpose of this paper is the development of a basis from which agreement may be reached on the choice of a theoretical framework. It describes work undertaken in the first stage of a long-term research project in progress at the University of Manchester. Initial support for the project has been provided by the Social Science Research Council. The basic motivation for the research was provided by the wish to study competing proposals for the treatment of changing price levels in accounting reports. The importance of the study is not restricted to the treatment of inflation, however. No conclusions on one aspect of accounting practice can be reached independently of a study of other practices used in the same statements; no judgment can properly be made on a method for the treatment of inflation without considering its effect in relation to systems for dealing with depreciation, stock valuation, and so on.

The need for an explicit statement of objectives

A starting point for the development of a theoretical framework for the judgment of accounting practices is the recognition that accounting reports are human inventions, presumably intended to satisfy some useful purpose. There are no natural phenomena to which we can refer to discover the fundamental nature of, say, profit.[1] Accounting statements are properly regarded as vehicles of communication, intended to convey information which will be useful to the recipient. It follows that a judgment about the usefulness of any accounting report should be made only in relation to some clear assumption about the purpose (objective) for which it is prepared. This paper attempts to emphasize the importance of the specification of objectives in studies of accounting, to discuss the nature of the various objectives that might be sought and to develop a view as to which objectives should be given priority in studies of accounting methods.

If the specification of objectives of accounting reports is to be helpful in the development of accounting theory, it must answer certain specific questions in detail. It must identify the group of people to whom the report is directed, so that we know the nature of their relationship with the undertaking. It must indicate the type of actions which the recipients will take on the basis of the information provided. In addition it must tell us about the tastes of the group – what they will want to achieve by their actions. Only then can we judge what information will be most useful. It would be helpful to know, for example, that the objective of an accounting statement was to provide information to shareholders to help with their decisions on buying, holding, or selling shares when their investment objectives could be assumed to be the maximisation of the present worth of future cash flows. It would not be helpful to be told that the objective was to give a true and fair view of profit – such a statement is vague and, indeed, tautological as a first step in a sequence of arguments designed to indicate how profit should be measured.

The desirability of an explicit statement of the objectives of accounting reports is, perhaps, self-evident. The information which has most value will vary according to what use is to be made of it. The case for agreement on objectives may be made clearer, however, if we explain the logical framework which we intend to apply to our study of the development of accounting theory. All decisions involve choices between alternative courses of action. The optimal choice will depend upon expectations of what future events will occur as a result of each possible course of action. Accounting reports, designed to provide information for decisions, could usefully involve the communication of the predictions of experts about relevant future events. If a record of past events is to be useful for decisions, there must be some relationship between events observed at different times in similar situations. The record of the past event must help in the prediction of the future events. That is not to say that it must yield perfect predictions – such success is extremely unlikely. The record of the past event would be valuable if, and only if, we could make better predictions on the average with the information than we could make without it.

This line of argument suggests that the study of competing accounting conventions should involve a study of their 'predictive value.'[2] A full discussion of the process would require a paper in itself but the main ideas may be understood by considering the steps involved:

(1) The first step would be to specify the objectives of the accounting reports – a description of the groups to whom the accounting reports are directed, the decisions which the reports are intended to

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[1] Cf. H. C. Edey, 'The Nature of Profit', *Accounting and Business Research*, Winter 1970.

[2] For a more detailed discussion of the concept of predictive value, see L. Revsine, 'Predictive Ability, Market Prices, and Operating Flows,' *Accounting Review*, July 1971.

guide and the objectives of the decision takers. We may assume, for purposes of illustration, that the objective selected is the provision of information to present shareholders of a company to guide their decisions on buying, holding, or selling shares; and that the shareholders wish to maximise the present value of future cash flows (to maximise wealth). For simplicity, we ignore the need to measure the risk of the investment.

(2) We next have to draw up a specification of all the methods which we might use for preparing accounting reports – or, at least those thought worthy of study. We might deal with the alternative possibilities that profit should be calculated by costing resources at original cost; original cost plus some adjustment for changes in general purchasing power; at replacement cost; and so on. We might also include various possible methods for the measurement of depreciation, stock values, and so on. Each combination of conventions would require separate study.

(3) We should then need to formulate a model for predicting future events which are relevant to the decisions under consideration, using the data generated by applying each set of accounting conventions to records of past transactions. In the case of our illustrative objective, the relevant future events are dividends which will be paid by the undertaking. These dividends may be assumed to depend on future operating cash flows from established operations and on opportunities to undertake investments in expansion of established operations on favourable terms. The objective of this stage of the study would accordingly be to identify the best model, in association with each several set of accounting conventions, for predicting future cash flows from operations and the broad results of future investment opportunities. We should have to experiment with various different models. Some would involve variables exogenous to the firm – for example, real national income. A choice of model would be made by conducting tests to discover which would have given the most successful predictions in past periods, the results for which are already known.

(4) The final stage involves the estimation of which combination of accounting conventions and predictive model would be most useful for decisions. No model will give perfect predictions – in some cases the predicted cash flows will be too high, in others too low. Each such forecasting error will involve the shareholders in an actual plan which is below the best possible. The shareholders may buy shares at too high a price, sell at too low a price, and so on. (The actual study should presumably consider both actual and future shareholders so that a sale at too high a price would be considered as bad as a sale at too low a price.) Statistical methods would make it possible to estimate which accounting methods would lead to the smallest shortfall between the actual plan and the optimal plan, *on the average.*

If we found that one set of accounting methods led to superior decisions, we should presumably adopt those methods, making the normal scientific assumption, until discredited by further experience, that the success of predictive models is stable over time. We might find that several accounting methods were equally good, in which case we should accept them as equivalent alternatives; or, we might find that none had any value – i.e., none gave better decisions than some random method – in which case we should conclude that records of past events had no usefulness for the decisions in question. In each case our choice would be tempered by the cost of operating the accounting system. One system would be preferred to another if, and only if, its use would increase the value of the decision taker's actions, on the average, by more than the extra cost of operating the system.

The objective of assisting shareholders' decisions is just one example of a choice of accounting objective. A similar process of logic would be possible whatever objective was chosen.

The scientific nature of the suggested process deserves emphasis. Some writers appear to advocate the use of deductive methodology. They believe that once objectives have been specified, it will be possible to deduce logically the best form of reporting. We believe, on the contrary, that the choice of the most useful methods for preparing accounting reports must involve a substantial empirical element. It must involve an investigation of the predictive model in relation to trial accounting reports prepared from actual data. It is no more possible to deduce, by abstract thought, the accounting methods that have the highest predictive value than it is to deduce the laws of gravity. A set of accounting practices might well be selected on the grounds that they seemed likely, *a priori*, to have a high predictive value; but such a selection should be regarded as tentative until its performance has been studied in practice.

The Accounting Standards Steering Committee has made several recommendations on accounting practice without specifying its assumptions about the objectives of accounting statements. It has indicated its intention to issue an exposure draft on objectives at some later stage. The Committee, in common with many writers on the subject, has approached its initial studies of accounting practices by specifying some assumptions about the identity of basic concepts of accounting and has proceeded by applying these concepts to particular problems. Examples of such concepts include the proprietary or entity concept, the going-concern concept, the accruals concept (matching costs and revenues), the realization concept, consistency and prudence (or conservatism). Confidence in such a procedure is not enhanced by the observation that some of the concepts may be mutually inconsistent; for example, prudence may conflict with the accruals concept. The procedure may well be justified given the need for the Committee to take some action in the development of standard practice as a matter of urgency. We believe it to be inappropriate, however, as a means of solving the longer-term problem. To the extent that the basic concepts of accounting involve identification of the users of accounting statements, they are better dealt with in the specification of objectives. To the extent that they go further, they may involve assuming part of the solution which the study is intended to produce.

The historical development of accounting objectives

The practice of accounting is of considerable antiquity. Some of the earliest known written records, dating from early Mediterranean societies, may be regarded as accounting records. They include lists of resources required to undertake communal activities, such as the building of religious monuments, and records of tax collections. In view of this antiquity, it may be a matter for surprise that there exists no agreed specification of the objectives of accounting. The lack of a specification may be understood, however, by considering the evolutionary process in which accounting has developed. Accounting practices have responded to the changing needs of society; but society changed slowly and it always seemed possible to meet a new situation by a small adaptation of established practice. At no time has a dramatic change in the social environment caused a breakdown of established accounting practice, provoking a complete review, the specification of an objective and its incorporation in a careful logical argument to reveal the most useful procedures.

The earliest objective of accounting seems to have been to meet the need of an individual to keep track of his property. This need was first met by simple lists, one for each type of property, with amendments to record changes as they took place. The valuation of property would have little importance in such a situation and most of the records originally dealt only with quantities. The basic control objective of accounting would have been especially important when someone employed an agent (steward) to manage his property and collect money due to him. A means was required for controlling the proper accounting for the property by the steward – and its provision represented the prototype of the stewardship function which is still important today.

As transactions became more numerous, errors of arithmetic would easily creep in to mar the usefulness of the records. Double-entry book-keeping first developed as a means of controlling the accuracy of the records. It involved attaching money values to each transaction, but so long as accuracy for control purposes was the primary objective, the choice of valuation method mattered little. Any method, applied consistently, would be adequate. Originally, little importance was presumably attached to the profit and loss account. Some accounts were established in order to complete the double entry for transactions which affected property. A record of the balances on such accounts would not be required after the checks on arithmetic accuracy had been completed – they did not indicate the amount of property that had to be controlled in the future; they were closed off to the profit and loss account, a repository for unwanted balances.

At some later time, interest developed in a measure of the success of business activity. It was seen that the repository of unwanted balances could be interpreted as giving a measure of gain over a period (profits) and that the balance sheet could be interpreted as a statement of net worth. Gradually, changes in accounting practice were adopted which seemed, in a rough and ready way, to improve the usefulness of the measures. The accruals convention grew into practice. The changes were grafted on to existing practices, however, and amounted only to minor adaptations of the basic control records.

The industrial revolution, over a long time span, reshaped society and set in progress new influences on accounting. The exploitation of newly invented machines called for large-scale production. Business required much larger sums of capital than previously, larger sums than could be provided by a small group of people. Companies were developed, with capital contributed by large numbers of people, few of whom would take part in management. A new importance was given to the stewardship objective – the managers had to account for the uses made of the funds put at their disposal. The original form of joint stock company involved great risks for the providers of capital. If a company failed, the personal property of shareholders could be sold to meet company debts. Many people were not prepared to take such risks without the protection of involvement in management. The device of limited liability, protect-ing the personal property of stockholders, was invented to reduce the risks, with the intention of promoting business development and, hopefully, increasing the national wealth.

The reduction in the risk of stockholders necessarily increased the risk of creditors. Some measure of protection for creditors was next sought within the accounting framework, particularly against the possibility that stockholders would be able to foresee failure and withdraw their funds, leaving little to recompense the creditors. The protection was achieved by further modifications of mainstream accounting. Drawings of stockholders were normally limited to profits and various practices developed to secure conservative measures of profit – measures 'on the safe side' so far as creditors were concerned.

More recently still, the increased complexity of business allied with competitive pressures created demands for information to help managers with decisions on pricing, selection of activities, and so on. Again, developments took place within the confines of established practice. Cost accounting and budgetary control were grafted on to accounting, influencing and being influenced by existing procedures.

Many other influences could be identified. A significant set concerned government activity. The uses of accounting measures for the assessment of taxation, for various statistical purposes and most recently for price control, have all represented pressures for minor variations in accounting practice. The end result is a single system of accounting which has adapted slowly to meet the slowly changing needs of the social and legal environment; a system which seems to attempt, in a confused way, to meet various different and possibly conflicting purposes at one time – the control of assets, stewardship, the protection of creditors, the measure of business success, taxation, management decisions, price control, and so on.

A preliminary specification of objectives

A researcher who wishes to develop a suitable basis for a study of the merits of different accounting methods might begin simply by writing a careful specification of all the objectives in which he was interested. Such a list might contemplate the following set of uses and users, each seeking to maximize wealth in some sense:

(1) The provision of information to shareholders (actual and potential) to guide their investment decisions, i.e., decisions on whether to buy, hold, or sell securities.

(2) The provision of information to inform shareholders of the uses to which their funds have been applied and the legality of those uses with a view to enabling the shareholders to exercise any legal remedies available.

(3) The provision of information to guide creditors (long-term and short-term) in decisions on the allowance of future credit and the administration of existing indebtedness.

(4) The provision of information to employees to guide their decisions on future relationships with the undertaking.

(5) The provision of information to managers to enable them to take efficient decisions in management.

(6) The provision of information to the representatives of society to enable them to judge whether the activities of the undertaking are consistent with national objectives.

(7) The provision of information to guide government officials in the assessment of taxation.

(8) The provision of information to guide government officials in the enforcement of statutory controls.

(9) The provision of information to financial institutions to assist in the negotiation of financial facilities.

The specification of objectives may require some qualifying statement to the effect that accounting reports should be designed to secure, as far as possible, parity of information for all members of a class of interested parties, insofar as they require it. It might be thought undesirable that some should have the privilege of access to information not available to others.

The second objective, listed above, corresponds to the so-called stewardship objective of accounting and has been widely regarded as important in practice. The usefulness of this concept, however, has been blunted by a failure to make clear exactly what it means. It has been used to signify the process of verifying that directors of a company have used resources at their disposal honestly for authorized purposes and, alternatively, in much wider senses, embracing some notion of efficiency.

Information provided as a guide for decisions can be useful only if it predicts those future events which can be influenced by the decisions. Reports on the honesty of directors may be relevant because past dishonesty is a predictor of future dishonesty and because the reports may predict the possibility of recovering illegitimate expenditures or exercising other legal remedies. Reports on past efficiency may be relevant as predictors of future efficiency but their scope is wider and their nature different. It may be useful, for the sake of clarity, to avoid the use of the word stewardship and to distinguish reporting on the legality of past behaviour on the one hand from reports on economic efficiency on the other. We have avoided the use of the word in conducting a questionnaire survey (see below). In other cases we use it in its restricted sense, excluding notions of economic efficiency.

In the long run, a research study would have little need for an indication of priorities as between different objectives. It would be necessary, simply, to consider each objective separately and decide how it could best be met. Such a study might indicate that each objective requires, ideally, different accounting procedures for its satisfaction. It would then be necessary to study the predictive value of each contending accounting method in relation to each objective to estimate whether the value of the improved decisions, derived from the use of the best methods for each objective severally, outweighed the cost of using several different methods. A compromise might be found to be optimal, involving the use of second-best methods for some objectives for the sake of cost economies.

In the situation described there would seem to be no need for an empirical survey to establish a consensus of opinion on objectives. We believe that such a survey is important at the present time, however, for several reasons. In the short term it will be necessary to concentrate research efforts on the objectives which have most practical urgency. Those who direct the research efforts should be prepared to lead opinion on the choice of priorities. They should also take account of opinion in the financial community, however, as a precaution against overlooking material considerations. A survey will make it possible to guard against the danger of overlooking important practical objectives, to gather opinion on the feasibility of achieving particular objectives with accounting statements and to gather opinion on priorities.

We now give indications from three sources about these questions: a survey of the literature, a survey of current opinion by interview, and a survey of current opinion by questionnaire.

Objectives in the literature

The literature on accounting does not provide the extensive discussion on objectives, leading to some measure of agreement, that one might expect. Writers have been proposing modifications to accounting methods for many years. They have presumably had in mind some uses which they thought would be facilitated by their proposals. They have rarely made their assumptions about uses explicit, however; and, in consequence, the rationale of their proposals has seemed unclear. That is, perhaps, one reason why so many theoretical issues in financial accounting remain unresolved today. This view is supported by Stone, writing in 1967: 'A search of the existing literature for a statement of objectives for published financial reports will inevitably lead to frustration.' And 'References to reporting objectives, when found, are either so vague as to give no direction to the development of theory or are specific but lacking a rationale for such objectives.'[3]

Various legal provisions governing the publication of accounting statements, mainly by limited companies, comprise one source which might be expected to provide information about opinion on the objectives of accounting. In fact, however, this source turns out to reflect the confused state of practice on the subject. Legal instruments generally specify the statements which are to be published, mainly the profit-and-loss account and balance sheet, and give detailed guidance about the form of those statements and the information that is required to be disclosed. In some cases the intended user of the statements is indicated – the shareholder is given the right to receive certain statements, for example; in other cases provision is made for inspection by anyone who is interested. It is usually provided that the published statements should show a true and fair view of the company's state of affairs or be drawn up in accordance with generally accepted accounting principles. Such provisions appear tautological. They do not deal with the difficulty that it is impossible to recognize a true and fair view of, say, profit until the purpose of measuring profit has been defined. A study of the information required to be published suggests that a variety of purposes are envisaged. Some are concerned with short-term liquidity and may be assumed to be required to indicate the degree of protection afforded to creditors. Some, such as the disclosure of directors' emoluments, appear to be intended to help shareholders to control the stewardship of directors. Some, such as the disclosure of export sales, is of interest for macro-economic policies, to the potential benefit of society at large. Other information, significantly, appears to be intended to assist in the prediction of future results and hence to be of interest to shareholders as investors. The analysis of turnover and profits by geographical area and by main activities appears to come within this category.

The pronouncements of professional and academic organizations provide another potential source of information about consensus views on the objectives of accounts. These sources appear to reflect a change in emphasis over time. In 1936 the American

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[3] D. E. Stone, 'The Objective of Financial Reporting in the Annual Report,' *Accounting Review*, April 1967.

Accounting Association said: 'The purpose of the statements is the expression, in financial terms, of the utilization of the economic resources of the enterprise and resultant changes in the position of the interests of creditors and investors. Accounting is thus not essentially a process of valuation but the allocation of historical costs and revenues to the current and succeeding periods.'[4] This expression of a stewardship objective of accounting has been echoed in various pronouncements of the Institute of Chartered Accountants in England and Wales: '. . . the purpose for which the annual accounts are normally prepared is not to enable individual shareholders to take investment decisions.' '. . . the results shown by accounts prepared on the basis of historical cost are not a measure of increase or decrease in wealth.' And 'A balance sheet is mainly an historical document which does not purport to show the realizable value of assets . . . and so is not a statement of the net worth of the undertaking.'[5] More recently, there has been some change in emphasis on the part of North American organizations. In 1966 the American Accounting Association's guidelines for communicating accounting information stressed that the information must be appropriate to its expected use by the potential users.[6] In 1970 a statement by the Accounting Principles Board of the American Institute of Certified Public Accountants referred to financial statements as giving information which will be useful in estimating the earnings potential of a company.[7]

A greatly increased level of interest in the specification of objectives has been shown in the literature in recent years. Particularly significant, perhaps, are three research studies undertaken for professional organizations in the United States and Australia. These studies do not represent official opinions. They do, however, represent carefully formulated opinions reached after consulting a considerable number of people.

The first of these studies is Moonitz's 'Basic Postulates of Accounting.'[8] Moonitz defined the objective of company reporting as the provision of data to be used as a basis for choosing between available economic alternatives and for checking and evaluating progress and results. Moonitz went further and argued, as we have done, that anyone who adopts a criterion of usefulness for accounting must answer two important questions: Useful to whom? And, for what purpose? However, he stopped short of accepting the full implication of this line of thought – that different information might reasonably be provided for different people and for different purposes. He thought it might be dangerous to formulate accounting principles for special interest groups.

A second, and most recent, report on the objectives of financial statements has been prepared by a study group of AICPA.[9] After wide-ranging discussions, extending over a period of two years, this group adopted the conclusion that 'The basic objective of financial statements is to provide information useful for making economic decisions.' This basic, and rather general, statement was developed thus:

> 'An objective of financial statements is to provide information useful to investors and creditors for predicting, comparing, and evaluating potential cash flows to them in terms of amount, timing, and related uncertainty.'

The study group expressed the further view that the objectives of accounting statements should focus primary attention on recipients who have limited authority, ability, or resources to obtain information and who rely on financial statements as their principal source of information about the economic activities of an undertaking.

The third study was commissioned by the Accountancy Research Foundation of the Australian Society and Institute.[10] The conclusions of its authors are in line with the general tenor which is emerging as a modern consensus. The objective of accounting is said to be:

> 'To provide financial information about the economic affairs of an entity for use in making decisions.'

Again the logical consequence is accepted:

> 'Evidence (indications) of the entity's future cash flows should have top priority in financial accounting.'

The study notes that the objective encompasses control as conventionally distinguished from other types of decision. It acknowledges that no proof can be offered of the appropriateness of the objective (as must always be the case with an objective, strictly defined), but attempts to disarm the sceptical by assuring them that accounting is only one source of the evidence for the decisions that are envisaged.

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[4] American Accounting Association, 'A Tentative Statement of Accounting Principles Affecting Corporate Reports,' *Accounting Review*, June 1936.

[5] *Members Handbook*, Institute of Chartered Accountaints in England and Wales, Recommendations S8, N18, and N15.

[6] American Accounting Association, *Statement of Basic Accounting Theory*, 1966.

[7] American Institute of Certified Public Accountants, Accounting Principles Board, *Basic Concepts and Accounting Principles Underlying Financial Statements of Business Enterprises* A.P.B. Statement No. 4, New York, 1970.

[8] M. Moonitz, *The Basic Postulates of Accounting, Accounting Research Study No. 1*, AICPA, New York, 1961.

[9] *Objectives of Financial Statements, Report of the Study Group on Objectives of Financial Statements*, AICPA, New York, 1973.

[10] W. J. Kenley and G. J. Staubus, *Objectives and Concepts of Financial Statements*, Accounting Research Foundation, 1972.

We have also discovered two publications by international accounting firms (from their United States offices) which give a similar emphasis to the 'decision-taking' objective of accounting. One expresses the view that 'The overall purpose of financial statements is to communicate information concerning the nature and value of the economic resources of a business enterprise, the interest of creditors, and the equity of owners in those economic resources. . . .'[11] This statement may be said to fail to go to the heart of the matter because it does not define either the decisions with which accounting is required to help or the identity of the decision takers. The central importance given to 'value' in the statement is nevertheless to be welcomed and would seem to imply a decision-oriented goal. The conclusion of the second study is quite specific. 'General-purpose financial statements are designed to report to investors on the use of funds they have invested in their enterprise in such a way as to facilitate their investment decisions of the future.'[12]

The literature thus provides evidence of a growing consensus that the usefulness of accounting statements should be judged according to the relevance of the information provided for decisions. It is not argued that stewardship is unimportant – the securing of proper stewardship is itself associated with significant economic decisions. It is coming to be acknowledged, however, that considerable importance should be attached to the provision of information to assist shareholders' investment decisions; and that is seen to involve the prediction of future cash flows. These views are not confined to writers of reports for professional organizations. Various academic papers have stressed the importance of the decision-making objective, either implicitly, in testing accounting practices for predictive value, or explicitly. Pankoff and Virgil argue, for example, that although 'financial accounting reports may have an historical perspective, the value of those reports cannot be measured solely by the accuracy with which they reflect the past. It seems safe to say that most users, investors, and creditors, for example, are not interested at all in the past, *per se*, but only to the extent that the past can be used to reflect the future. In other words, firms' past records are useful to the extent that they help users to make investment decisions about an uncertain future.'[13]

The acceptance of forward-looking objectives has not been unanimous, though recent dissent seems to be much smaller in volume. Bevis argues, for example, '. . . the fact that prospective investors may use financial information contained in the report to assist them in making projections concerning investment decisions . . . does not belie the report's essential nature and purpose as an historical account of what has taken place.'[14]

Most of the opinions summarized in this section are of North American origin. We now turn to the presentation of evidence from two surveys which we have undertaken to discover the balance of opinion in the financial community in Britain.

A survey by interview

Our first survey involved 26 interviews of representatives of six large firms of chartered accountants in Manchester and of financial specialists in their client companies to whom introductions were provided.[15] We attempted to cover as wide a range of occupation as possible. A summary of interviewees by occupation is given in Table 1. The results of the survey may well give a biased representation of opinion amongst members of the financial community at large, because of the preponderance of members of large undertakings. The opinions of those who may be amongst the leaders of the financial community are of particular interest in their own right, however.

The interviews were unstructured – in particular, no prepared list of questions was used. They also attempted to avoid the danger of leading the interviewees – the interviewers refrained from giving their point of view in the early stages. They simply explained the general problem area in which we were

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[11] Arthur Andersen and Co., *Objectives of Financial Statements for Business Enterprises*, Chicago, 1972.

[12] Price Waterhouse and Co., *The Objectives of Financial Statements*, New York, 1971.

[13] L. D. Pankoff and R. L. Virgil, 'On the Usefulness of Financial Statement Information,' *Accounting Review*, April 1970. See also, R. J. Chambers, 'The Role of Accounting,' *The Accountant*, February 1969; C. R. Tomkins, 'Development of Relevant Published Accounting Reports,' *Accountancy*, November 1969; M. J. Mepham, 'Towards a Definition of Accounting,' *The Accountant*, October 1967; Y. Ijiri and R. K. Jaedicke, 'Reliability and Objectivity of Accounting Measurements,' *Accounting Review*, July 1966; and R. J. Briston and R. A. Fawthrop, 'Accounting Principles and Investor Protection,' *Journal of Business Finance*, Summer 1971.

[14] H. W. Bevis, *Corporate Financial Reporting in a Competitive Economy*, Macmillan, 1965. See also, F. K. Wright, 'A Reply,' *Journal of Accounting Research*, Autumn 1969.

[15] We should like to thank the Manchester Accounting Study Group for help with this section of our research. MASG is an association of accountants in practice and in universities in Manchester for the promotion of research in accounting.

TABLE 1
Analysis of Interviews in Pilot Study

Chartered accountants in practice		6
Accountants responsible for preparation of annual financial statements:		
Large companies: Industrial	6	
Commercial	3	
Small companies: Industrial	2	
	—	11
Users of annual financial statements:		
Financial analysts	4	
Bankers and financiers	5	
	—	9
		—
Total number of interviews		26
		—

interested and asked for reactions. We were anxious to avoid any possibility that we might receive the answers which we were thought to want, rather than an unbiased expression of opinion. Moreover, we regarded the interviews, in part, as a pilot study for the second survey, by questionnaire, and we therefore wanted a broad indication of the issues which practitioners thought to be of importance.

The interviewees concentrated on two main descriptions of objectives, the 'stewardship aim' and the 'decision-taking aim.' The precise significance of these expressions is subject to some uncertainty. Many interviewees, indeed, emphasized the interdependence of stewardship and decision-taking. However, the spirit of the distinction is caught by regarding the stewardship objective as the provision of information on how the directors have handled shareholders' funds, information which could lead to votes for the removal of directors from office, or legal proceedings against them in an extreme case. The decision-taking objective is the provision of information to guide the investment decisions of shareholders.

The views expressed by interviewees are summarised in Table 2. The interviews demonstrated a considerable strength of opinion giving primary emphasis to the decision-taking objective. We found widespread recognition that investors are interested in the past only to the extent that it can be used to predict the future; 85 per cent of interviewees suggested spontaneously the need for some sort of forecast to be transmitted to shareholders.

Several interviewees stressed the differences between investors of small sums and investors of large sums. The small investor was characterized as ignorant of accounting, dependent upon financial advisers, incapable of getting information elsewhere, and unlikely to switch investments because of apathy or loyalty. These arguments do not suggest that there are different objectives in reporting to small and large investors, but may suggest the need for different means of satisfying them. Some interviewees suggested the need for two forms of accounting report, a full report and a simplified version; others took an opposing view and suggested that accounting reports should be designed in a way that would attract interest.

The questionnaire survey

Our second survey involved the use of a questionnaire and was designed to investigate the attitude of members of the accountancy profession at large

TABLE 2
The Objectives of Annual Financial Statements

	Chartered accountants	*Accountants**	*Users*
Respondent considered *decision making* by investors (shareholders and creditors, etc.) to be:			
(a) the primary objective	4	8	5
(b) a joint main objective (with stewardship)	2	2	2
(c) a secondary objective	–	1	–
(d) irrelevant	–	–	2
	6	11	9
Respondent considered *stewardship* to be:			
(a) the primary objective	–	1	1
(b) a joint main objective (with decision making)	2	2	2
(c) a secondary objective	3	–	–
(d) not mentioned	1	8	6
	6	11	9

*Accountant refers to the persons responsible for the preparation of the annual financial statements, towards the relative importance of various objectives for published financial statements.[16] Respondents were asked to give their opinions as private persons, not as representatives of a firm or other undertaking, and to give their opinions in relation to the published annual profit and loss account and balance sheet of a company with a stock exchange quotation. Questionnaires were sent to a sample of 600 members of British professional accountancy bodies and 121 usable replies were received.

In view of the low response ratio (20 per cent) it would be dangerous to attempt broad generalizations from the analysis of the replies. It is possible that the respondents represent a self-selected sample comprising those who show most interest in keeping abreast of modern developments in accounting. However, the views expressed by such a group would be of interest in themselves. The replies were analyzed in two separate ways. First, the respondents were divided into three groups, according to their *main* employment – (i) partner or employer in practice; (ii) employed as an accountant in industry, commerce, or finance; and (iii) other. Second, an analysis was made on the basis of the activities which formed a significant part of the respondents' main employment – (i) use of published accounts, (ii) preparation of published accounts, (iii) audit of published accounts, and (iv) other. The analysis failed to reveal significant differences between the opinions of different groups and we therefore focus our main attention on the results in aggregate.[17]

The nub of our enquiry was expressed in a question which asked respondents to rank, on a seven-point scale, the importance they thought *should be* attached to a number of possible objectives for published accounts. The question read as follows:

> We list below a number of possible purposes for the preparation of published accounts. In answering this question assume that changes may be made to the present form and content of accounts. Please circle a number on the right, opposite each purpose, to indicate your assessment of the importance which *should be* assigned to that purpose – 1 means very important, 7 means of negligible importance.

For each possible purpose listed in the question an average score has been computed by taking an arithmetic mean of the rank numbers given by each respondent.[18] The averages are presented in Table 3; the purposes are listed in the order of importance determined by their average scores. The position in which each purpose appeared on the questionnaire is indicated by the numbers in parentheses.

'The provision of information to shareholders on the use made of their funds and the legality of those uses' consistently received a high ranking. Seventy-four per cent of respondents ranked it at point 1, i.e. very important, and a further 12 per cent at point 2. It may be supposed that respondents interpreted this purpose as the 'stewardship' objective. The high ranking given to the stewardship objective was, perhaps, to be expected in view of the usual emphasis placed on stewardship in professional training programmes. More surprising, and therefore of particular significance, is the high ranking accorded to the provision of information to shareholders and investors at large to help with their investment deci-

TABLE 3

Purposes for the preparation of published accounts

The provision of information to:	*Average score**
Shareholders on the uses made of their funds and the legality of those uses (2)	1.6
Shareholders to assist their investment decisions (4)	2.4
Investors at large to assist their investment decisions (6)	3.0
Creditors for the protection of their interests (3)	3.3
Financial institutions to assist in the negotiations of financial facilities (9)	3.3
Employees for the protection of their interests (5)	3.6
Managers to assist in managing the company (7)	4.1
The inland revenue as a basis for taxation assessment (1)	4.7
The general public to enable them to judge whether the behaviour of the company is consistent with national goals (e.g., on pollution, employment, exporting) (8)	4.9
Government officers as a basis for enforcing statutory controls (10)	5.2

*The average score is measured on a 1–7 scale: 1 means very important, 7 means of negligible importance. The mid-point of the scale is 4.0.

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[16] We should like to thank *Accountancy Age* for meeting the costs of undertaking this survey.

[17] Statistical significance tests have not been carried out on the differences between the groups as we do not believe that the data warrant extensive statistical analysis. However, the general response to most questions was similar from group to group.

[18] It may be argued that averaging is not an appropriate technique because the points on the scale are not precisely determined. As no further statistical analysis is attempted, averages seem to be a reasonable way of summarizing the replies.

sions. The questionnaire survey supports the finding of the interview survey that considerable importance is now attached by members of the accounting profession to the investment decision objective although the strength of opinion differs as between the two surveys.

Investors, creditors, financial institutions and employees were all regarded by respondents as being of some importance – the provision of information to each of these groups received an average score greater than the mid-point on the scale. These groups are those with the most direct economic interests in companies. The groups with more indirect interests, the general public and the government, were regarded as being of less importance.

A degree of agreement amongst the respondents was in evidence. For most of the possible purposes listed in the question, at least two-thirds of respondents ranked the importance of the objective within two points of the average score it received. The exceptions were the provision of information for managers, the tax authorities, and the general public. The differences of opinion about the importance of provision of information for managers (in published accounts) has probably arisen because the size of the company was not specified in the question. Some respondents may have had in mind a relatively small company with no separate system for providing management information – in such a case the published accounts would be of great importance to managers. Other respondents may have thought of large public companies, with extensive management information systems. The low average score given to management information probably reflects the view that published accounts are normally an unsuitable vehicle for management purposes.

The differences of opinion about the importance of information for the general public may indicate a growing awareness of social responsibilities, which has yet to be accepted by all sections of the profession.

The survey included a question which asked the respondents to indicate how successfully, in their opinion, current accounting practice meets the significant purposes of published accounts (as indicated by their responses to the question referred to above). Replies to this question may be taken to indicate the urgency of the need for research into accounting theory. A nine-point scale was used, 1 meaning very successfully and 9 meaning not at all successfully – the mid-point is 5. Once again, an average was used to summarize the replies received.

The average score of all the replies was 4.7, which is close to the mid-point, and may be interpreted as a moderate level of success. The replies demonstrated some measure of agreement: 90% of the replies ranked the success of current practices at one of the points 3 through 7. There was little variation in the average scores on the analysis based on main employment and significant activities. Current practices were considered to be slightly more successful by accountants in practice (average score = 4.1) than by accountants employed in industry, commerce, or finance (average score = 5.0). But the extent of the difference is so small that no definite conclusions can be justified.

Respondents were next asked to rank in order of importance six criteria which have been suggested as tests for deciding whether accounting information meets the purposes of published accounts. The question asked was in the following form:

> The following criteria have been suggested as tests for deciding whether particular accounting information meets the purposes of published accounts. Please write numbers in the boxes to rank the criteria in order of importance for judging the contents of published accounts: i.e., indicate by your ranking the criteria to which you would assign priority in case of conflict; 1 means most important, 2 means second most important, and so on:
>
> Objectivity (information can be verified independently)
> Understandability
> Relevance to purpose
> Uniformity of measurement conventions between different companies
> Fairness
> Conservatism or prudence

This question provides some secondary evidence about the strength of opinion in favour of a decision-taking emphasis as opposed to stewardship. A decision-taking approach would presumably emphasize 'relevance to purpose' whereas 'objectivity' might be viewed as especially important in relation to stewardship. Averages were computed from the rankings given to each criterion, and in Table 4 the six criteria are ranked according to their average scores.

TABLE 4

Ranking of accounting criteria

1	Understandability
2	Relevance to purpose
3	Fairness
4	Uniformity of measurement conventions between different companies
5	Objectivity (information can be verified independently)
6	Conservatism or prudence

The analysis by main employment and significant activities revealed almost identical rankings. Understandability (which may be accepted as a *sine qua non* for any objective) and relevance to purpose were first and second, and conservatism was sixth in *all* the analyses. There were slight variations in the average rankings of fairness, uniformity, and objectivity. The most interesting feature of the replies to this question is the low ranking given to objectivity and conservatism in contrast to the high ranking given to relevance. The low ranking given to conservatism (prudence) is particularly interesting in view of the opinion expressed in *Standard Accounting Practice 2* that conservatism should normally override other accounting conventions in cases of conflict.

Whilst undertaking this survey the opportunity was taken to ask a question about the importance of certain supplementary data which have been proposed or are sometimes adopted as appendices to published accounts. The question ran as follows:

> It is often suggested that some or all of the following should be annexed to published accounts. Assume that published accounts continue to have the same form and content as at present. Please circle a number against each item to indicate its importance – 1 means very important, 5 means of negligible importance.

The items which were listed are presented in Table 5 in the order in which they appeared on the questionnaires. Table 5 gives the average score for each item on a five-point scale – i.e., a mid-point of 3. The closer the score to 1 the more important is the item.

There was substantial agreement about the importance of a funds flow statement, a profit breakdown, and a statement of current values. Although some support was given to the provision of short-term forecasts, there was little support for forecasts of either dividends or profits beyond one year. These results may seem to be inconsistent with the replies to the previous question in view of the relevance of forecasts to decision-taking purposes. They may reflect the fact that respondents have not thought out the implications of their views. Alternatively, they may reflect the view that accountants and business managers are not capable of preparing realistic forecasts for more than one year ahead.

TABLE 5
The importance of Supplementary data

	*Average score**
Funds flow statement	1.8
Profit breakdown by activity in more detail than at present	2.0
Forecast of profits for one year	2.7
General price-level adjusted accounts	2.7
Forecast of profits beyond one year	3.8
Forecast of dividend for one year	3.3
Statement of current values of assets	1.8
Forecast of dividend beyond one year	4.3

*The average score is measured on a 1–5 scale: 1 means very important, 5 means of negligible importance, and the mid-point is 3.

There was a marked lack of agreement about the desirability of general price-level adjusted accounts. There was a material number of rankings at each point on the scale – with the average near the mid-point. The disagreement about the importance of general price-level adjusted accounts was interesting, particularly in view of the strong agreement about the importance of a statement of current values.

Conclusion

Writings on accounting theory have generally been vague about the objectives of accounting reports. We believe that little progress can be made toward agreement on best methods of preparing such reports until the objectives are made explicit and related analytically to the choice of method. The chosen objectives must emphasize the decisions which will be taken on the basis of the accounting information – for information is strictly valueless unless there is some chance that it will influence future actions.

The traditional stewardship objective of accounting is still widely acknowledged as important. There appears to be a growing consensus, however, that the provision of information to assist shareholders with their investment decisions should be recognized as a second important objective of accounting statements. We intend to investigate the implications of the acceptance of such an objective for the selection of accounting practices in the second stage of our research programme. The firm acceptance of an investment decision objective by professional bodies of accountants would be a new departure. We believe, however, that such acceptance would recognize the realities of the situation. There is a good deal of evidence that investors do use accounts to some extent in taking their investment decisions, and if such use is prevalent, it would seem to be desirable that the accounts should be made as useful as possible for the purpose. The degree of usefulness which can be achieved by accounting is still uncertain and must be investigated by further research. We believe that the acceptance of the investment decision objective by professional accounting bodies is important for the impetus that it would give to such research.

Sub-optimal Production Runs: a case study

D. G. Rhys

The purpose of this short paper is to show that the profits squeeze experienced[1] by the UK motor car producers in the late 1960s and early 70s was not necessarily due to the restrictions placed on the car market by government policy and actions, but was partly due to inefficiency on the part of individual producers. An illustration of the way a firm was largely master of its own performance has been the product-cycle policy pursued by General Motor Corporation's British subsidiary Vauxhall Motors.

In September 1963 Vauxhall introduced its challenge in the small car market, the type HA Viva. In 1966 this was replaced by the HB model which in turn gave way to the HC model in 1970. During this period GMC's German subsidiary, Opel, made just one basic model of the Kadett, a car on which the HA Viva was largely based.

During its lifetime (1963–1973) the Kadett achieved a total output of 3,300,000, but the original Viva meanwhile was replaced after reaching a sales total of just over 300,000. This meant that not only did Opel maintain the same basic model over a longer period than Vauxhall, but it made the car in annual volumes which were three times that achieved by the

TABLE 1
Pre-Tax Profits (£ million)

Year	*Rootes*	*BMC*	*BLMC*	*Leyland*	*Ford*	*Vauxhall*
1960	4·4	26·9		9·2	33·7	14·1
1961	2·9	10·1		6·9	22·2	14·5
1962	− 0·89	4·2		5·5	17·0	16·0
1963	− 0·25	15·4		11·0	35·0	16·3
1964	1·8	21·8		18·2	24·0	17·9
1965	− 0·2	23·3		20·5	8·9	17·7
1966	− 3·1	21·8		16·4	2·4	13·7
1967	−10·5	− 3·28		18·0	25·4	12·0
1968	3·9		37·95		43·0	12·2
1969	0·61		40·0		38·1	1·6
1970	−10·0		4·0		20·9	− 5·16
1971	0·35		32·0		−30·7	1·8
1972	1·64		31·9		46·8	− 4·1

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[1] See Table 1.

British producer. Normally a relatively low annual output is partly offset by a manufacturer keeping a basic model in production for longer than its rivals; Vauxhall did quite the opposite in relation to Opel and indeed to other firms such as the former British Motor Corporation. The total costs specific to the HA Viva would be design and development costs on the one hand and body costs on the other, perhaps a total of some £10 million.[2] Given a similar position in Germany the unit costs from these sources, specific to the models involved, would have been therefore £33 for Vauxhall but only £3.3 for Opel. In short, Opel was one of the largest German car makers and Vauxhall was one of the smallest British producers, yet it appears that the latter's product cycle policy was designed to exaggerate its smallness rather than to minimise it.

It could be that as Opel was the market leader in Germany with VW,[3] a firm making a highly differentiated product highly dissimilar to Opel's, but a market follower in the UK, the introduction of the Ford Escort in 1968 may partly explain Vauxhall's policy. However, this hardly explains the 1966 model change, for as the gestation periods in Vauxhall and Ford are similar the potential threat of a 1968 model launch by Ford would not be a complete explanation for the short life-cycle of the HA Viva. Alternatively, as it was well known that Ford would eventually have to produce a replacement for the Anglia, probably 'up market', this 'general' knowledge may partly explain Vauxhall's behaviour. Again, perhaps Vauxhall's desire to improve and widen the appeal of its Viva by moving away from direct competition with the Ford Anglia to a position 'up market' is a partial explanation. However, as the Anglia had been introduced four years before the HA Viva such an hypothesis is only plausible on the grounds of a mistaken decision by Vauxhall to introduce the Viva in the first place, and as the company expressed great satisfaction as to the car's market penetration[4] such a view is not consistent with the facts. It appears that Vauxhall simply decided on a three year life cycle following the usual product-cycle hypothesis to justify a model replacement aimed at continued sales growth.

Before the HA type Viva appeared plans for the new model, complete with timing, were implemented as part of a long-term programme. This timing was to be based on Vauxhall's own success rather than on the success of rival models. The HB Viva was designed to increase the company's market penetration above the 1963–66 level of 12 per cent with which the company was dissatisfied. The original Viva was made as a light small car (but above the mini class) so that few sales would be transferred from Vauxhall's larger Victor range, i.e. Viva sales would be mainly net additions to the company's output. The new but larger HB Viva could settle into the market position already gained by the older car and thereby avoid taking sales away from other Vauxhall models. However in order to increase sales Vauxhall would have been advised to design a 'range' of vehicles and not a 'replacement'. The company was expecting almost too much from one car, for the first Viva did achieve good sales given that exports were not vigorously pursued. It is a marketing fact that while Opel's Kadett was similar to the HA Viva, the German company's later Ascona model was similar in size to the larger HC Viva. In other words, Opel widened its range while Vauxhall missed a similar opportunity of doing so.[5] Widening a range can only be done by 'losing some sales to oneself' while at the same time retaining most of the original market and penetrating new sectors. If Vauxhall's objective in launching the original Viva was simply to gain a safe entry into the small car market while planning a replacement of wider appeal then it can only be concluded that such a policy was short-sighted. The company's market penetration could only significantly increase over that achieved by the HA Viva if a wider range of vehicles was marketed, in effect the HA Viva plus a car similar to the HC Viva. Furthermore any extra sales that were made because of the introduction of the new model in 1966 hardly appear commensurate with the likely effects on profits of such a short product life cycle. Therefore the poor profits earned by Vauxhall could be largely due to the product cycle policy followed in the manufacture of its best-selling model. Compared with Opel, Vauxhall may have carried a 'cost penalty' of about £30 on each car. If so, then the seriousness of this is evident when it is considered that Ford's record profits earned in 1972 worked out at £62 per vehicle or a profit margin of just 6 per cent on a turnover of £797 million. In other words, and taking Ford's larger market penetration into account, a life-cycle policy based on Vauxhall's behaviour would have severely curtailed Ford's profits. BLMC's profits per vehicle were only just over £30, so again the life-cycle would be a crucial variable in the profit and loss equation. The unit costs of Vauxhall compared with Opel, even given the latter's greater market penetration, could be significant in explaining Vauxhall's poor performance especially in the late 1960s.[6] If prices were geared to those charged by the market leader (in effect therefore Vauxhall's price was 'given' by the market), and taking Opel's position as a market leader in Germany as a guide, it meant that Vauxhall's potential mark-up may have been eroded by almost £30.[7] That is, any attempt to pass on the higher unit costs would have meant a relative price rise by Vauxhall *vis-a-vis* its competitors and a curtailment of sales, therefore most of the 'cost-penalty' had to be absorbed. If Vauxhall had retained the HA Viva in production for as long as Opel maintained its 1963 Kadett then its profits per unit may have been helped by over £20, for with a model run of one million cars unit costs from the sources indicated above, i.e. those specific to the HA Viva (or for that matter to the HB or the HC models), could have fallen to £10.

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[2] (i) See D. G. Rhys 'The Motor Industry, an economic survey' Chap. 8, p. 260/301. Butterworths, London, 1972.
(ii) Each clay and fibre-glass mock-up or prototype can cost £65,000.

[3] In 1972 Opel for the first time since the pre-war period became the market leader in Germany, its widening range outselling VW's more limited range of cars. However, because of its immense export sales Volkswagen was still the largest producer. This, in parenthesis, illustrates the 'problem' posed by a multi-national firm in competition with a national producer; Opel does not have the same commitment to export as VW, for Opel exists primarily as GMC's outpost within the German market. As a result fewer export sales, which may be at only a little above marginal cost, are made, while VW has to satisfy the Government's wishes on the export front and may thereby harm its profitability.

[4] *Management Today*, April, 1967, 'Why Vauxhall relaunched the Viva', p. 85. As the car was planned as a 'safe entry' into the small-car market, annual sales of over 100,000 a year would have come up to expectations.

[5] Vauxhall has attempted to widen its appeal by producing more and more versions of the basic Viva design. This policy has had some success but it is not as satisfactory as widening appeal by making one or two additional basic models, a lesson which the company may now have learnt. Equally a proliferation of models made in small numbers would be mistaken and costly.

Vauxhall's commercial vehicle output (sold under the Bedford name) is subject to a quite different policy. The Bedford 7 cwt van, which is based on the HA Viva, is still in production while the standard lorry-cab has been manufactured since 1960. The Bedford 10/12 cwt van (CA type) was made between 1952 and 1970. Where cars are concerned Vauxhall, which is one third the size of Ford (UK), followed a similar product cycle with its Victor as Ford did with its best-selling Cortina.[8] Furthermore by 1973 the Ford Escort had already been in production for five years, while no Viva models had yet been produced for so long.

In retrospect, Vauxhall's policy with the Viva may have had unforeseen consequences on the UK's net balance of payments for motor cars. If the small one litre HA Viva had been retained in production together with the HC Viva, renamed as a net addition to the model range, then a greater choice of domestically produced vehicles would have been open to consumers. This would have been especially relevant where the small HA Viva was concerned for with its 1 litre engine and basic price of £470, just £57 more than the mini but £64 less than the BMC 1100, the car would have provided a greater choice of British made cars in the light car market. It is here and in the less price conscious but novelty and status seeking executive and luxury classes that imports have done best in 1973 (and 1972) as Table 2 shows.

In conclusion the squeezed market clearly had something to do with profitability during the late 1960s and early 1970s but the scale of operations and the product life-cycle policy were also important. The smaller firms Rootes (Chrysler UK) and Vauxhall had a poorer profit record than the other producers, one year taken with another. However, Vauxhall did nothing to offset its smallness by its product-cycle programme; indeed as is indicated above, the company appeared to compound its small size by its relatively limited total production runs. The firm is of less than optimally efficient size to begin with, but the policy

TABLE 2
First Quarter Registration in 1973
(Rounded to nearest '000)[9]

Class	*Registrations*	*Import Share %*	*No. of British Cars available*
Light	57,000	52	2
Small	147,000	22	4
Medium	154,000	8	5
Large	33,000	7	3
Sports	19,000	15	3
Executive	29,000	54	2
Luxury	7,000	45	2

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[6] Throughout the mid 1960s, the Bedford truck and coach sales and profits were sufficient to bolster Vauxhall cars' poor performance.

[7] Hypothetically, given an output of 100,000 cars an extra £30 could have improved the net financial position by £3 million; with an output of 200,000 the figure would be over £6 million. (With such an output a fall in unit costs would also occur.) These totals should be looked at in the light of the position shown in Table 1.

[8] In 1972, 187,159 Ford Cortinas were registered in the UK compared to 36,651 Vauxhall Victors. The figures for the Ford Escort and the Vauxhall Viva were 140,837 and 99,393 respectively.

[9] Source: The Society of Motor Manufacturers and Traders.

of rapid model replacement prevented the maximum spreading of fixed costs which could have partly offset the smallness of the operation by lowering the cost curve at the going output level. In terms of internal efficiency Vauxhall's performance is unfortunately not unique for, apart from Ford (UK), a case can be made for explaining the poor profits of *other* British car firms in terms of internal problems unconnected with the state of the market, the latter simply exaggerating an existing problem or malaise. For instance, Leyland's main task since 1968 has been to improve the management of British Leyland as a whole,[10] although its net cash shortage forced the company to follow a policy of long-lived model runs.

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[10] If anyone doubts that poor management caused many of Standard-Triumph's or BMC's problems let them read G. Turner's *The Leyland Papers*, Eyre and Spottiswood, London, 1972.

Enterprise Income: Survival or Decline and Fall?

T. A. Lee

Introduction

> '... it is possible for individual income calculations to have an important influence on individual economic conduct; for calculations of social income to play such an important part in social statistics, and in welfare economics; and yet, at the same time, for the concept of income to be one which the positive theoretical economist only employs in his arguments at his peril. For him, income is a very dangerous term, and it can be avoided; a whole general theory of economic dynamics can be worked out without using it'.

This warning to economists was argued and demonstrated by Hicks[1] within the context of his analysis of income as a useful theoretical tool for examining personal economic behaviour. Some years later, Frankel added further weight to the argument when he stated that income is no more than a conventional symbol which has relevance only in certain well-defined circumstances related to developed societies.[2]

> 'There is no harm ... in conventional ways of looking at certain things. The danger arises when we forget what is convention and what is reality, and when merely conventional symbolism determines unduly the goals of public policy'.

The caution and concern related to the use of the concept of personal income in economic analysis remains of no more than academic interest to accountants until it is noted that similar remarks have been made about enterprise income, and by an accountant.[3]

> 'Just as Hicks was led to the conclusion that income was not an effective tool of economic analysis, so it seems to me that we are led to the conclusion that periodic income is not an effective tool of financial planning or control. This conclusion seems to accord ill with the fact that income measurement has long been a central theme of accounting and the main preoccupation of the accounting profession. Yet this fact need not impress us. The practice of medicine once consisted largely of blood-letting. It may be that we are already witnessing a decline in the importance of income measurement'.

Solomons developed his argument in even stronger terms:[4]

> 'The fact is that for several important purposes periodic income, either historical or perspective, has already been or is being superseded. For decision-making purposes the idea of 'contribution' has taken over from net income. In the field of taxation, we depart from income as the tax base every time we introduce special allowances for depletion, or provide for accelerated depreciation, or permit an anomalous treatment of capital gains. Even for reporting to stockholders, just as in the first half of this century we saw the income statement displace the balance-sheet in importance, so we may now be de-emphasising the income statement in favour of a statement of fund flows or cash flows. Each of us sees the future differently, no doubt. But my own guess is that, so far as the history of accounting is concerned, the next twenty-five years may subsequently be seen to have been the twilight of income measurement'.

This viewpoint of Solomons, perhaps not surprisingly, has remained a minority one since it was made originally. Certainly, as a search of the accounting literature reveals, there has been a marked lack of response to his propositions. The literature continues to concentrate on writings centred around the concept of enterprise income; the implied assumption being that, at least in the opinion of numerous writers, income is of the utmost importance in economic activity. It dominates thinking in the area of financial accounting and reporting, and it is widely used in investment analysis. Its significance remains unquestioned, unchallenged.[5] Is Solomons, therefore, right or wrong? The purpose of this essay is to attempt to explore several of the major issues involved in order that the debate may be continued after more than a decade of silence. In particular, it will discuss, *inter alia*, the elusive nature and quality of reported enterprise income figures; the information requirements of investors and other interested persons; and the arguments for funds flow and cash flow reporting. The discussion will take place entirely within the context of financial reporting for corporate enterprises.

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[1] J. R. Hicks, *Value and Capital*, Second Edition, Clarendon Press, 1946, pp. 180–181.

[2] S. H. Frankel, *Economic Impact on Underdeveloped Societies*, Basil Blackwell, 1953, p. 55.

[3] D. Solomons, 'Economic and Accounting Concepts of Income', *The Accounting Review*, July 1961, p. 382.

[4] Solomons, op. cit., p. 383.

The elusive concept of reported enterprise income

The purpose of this section is to demonstrate that enterprise income is no more than a conventional financial management symbol which is capable of definition and computation in a variety of ways. In particular, the following points will be elaborated on:

1. The problem of the existence of a variety of differing income concepts for reporting purposes because of different interpetations placed on the meaning of the underlying capital computations.
2. The problem of flexibility with regard to the application of accounting principles in the process of enterprise income measurement.
3. The problem of flexibility in accounting practice due to the degree of subjective judgement which is part of the enterprise income measurement process.
4. The problem of unsatisfactory measures of enterprise income due to the exclusion of significant elements from the computation of capital, notably those relating to goodwill and other intangible resources.

Differing Concepts of Income

This essay is concerned with problems associated with the nature and measurement of income as related to the corporate business enterprise – that is, pertaining to concepts of income which are or could be reported to shareholders and other persons interested in the economic progress and affairs of the limited liability company. In this respect, a review of the relevant literature reveals that enterprise income cannot be thought of solely in terms of the traditional *ex post* periodic matchings of revenues from sales with related costs. Such may be the current concept of reported enterprise income, but it is certainly not the only one available.

The economist's view of income, for example, is entirely different from that of matching past efforts and accomplishments. Conceived originally by Fisher[6] in terms of personal consumption and psychic experiences classified as enjoyment, its current form is based upon the Hicksian model[7] of measures of periodic consumption plus periodic changes in the value of economic capital – the so-called concept of 'welloffness'; income being the maximum a person can consume in a period and still be able to expect the same level of consumption in the next period. Consumption, in this sense, is related to the expired economic benefits derived from capital, and the value of economic capital is measured on the basis of an aggregation of the present values of anticipated future economic benefits.[8]

The economist uses the Hicksian concepts of income as a means of theorising about the economic behaviour of individuals, rather than of business enterprises. Consequently, it is a concept which appears to be somewhat irrelevant to the corporate financial reporting function which is concerned primarily with aggregate measures of entity activity. However, at least in theory, the economic income concept can be adapted to the enterprise role – either as an 'equity' concept, with consumption defined in terms of realised or realisable dividends, and capital defined in terms of the present value of future dividend and investment realisation flows; or as an 'entity' concept, with consumption defined in terms of the realised or realisable aggregate entity cash flows, and capital defined in terms of the present value of future aggregate entity cash flows. Whichever interpretation is used, enormous problems would arise in practice if such adaptation took place – for example, forecasting over considerable periods of time, selecting an appropriate discount factor, the reinvestment constraint in order to maintain future 'welloffness'[9], and the treatment and attribution of 'windfall' gains or losses in the *ex ante* and *ex post* variations of the Hicksian model.[10]

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[5] The Companies Act 1929 was the first British enactment requiring boards of directors to provide their shareholders with an income statement, the previous feeling being that publication of such documents would stimulate competition (see The Report of the Company Law Amendment Committee, 1906).

[6] See, for example, I. Fisher, *The Theory of Interest*, Macmillan, 1930, pp. 3–35.

[7] Hicks, op. cit., pp. 171–181.

[8] For fuller details of these computations, see P. Hansen, *The Accounting Concept of Profit*, North-Holland Publishing, 1962, pp. 9–44.

Each of the above problems associated with the measurement of economic income tends to minimise the practical worth of the concept for financial reporting purposes. This is not to say that the various economic income models have no useful purpose – indeed they have, but only in the sense of helping to make rational theoretical explanations of income which aid an understanding of its nature. Certainly, capital valuations in terms of discounted future benefits, and income measures in terms of incremental capital value movements, appear to conform best with the reality of the meaning of the income symbol, particularly from the point of view of treating capital as a valuation of future income, and income as a measure of the expired portion of such capital. The rather false and misleading isolation of capital from income, as if they were two distinct and separate concepts, is thus avoided in the Hicksian philosophy. Unfortunately, the practical problems mentioned above negate completely the use of the Hicksian approach for financial reporting purposes. This inevitably leads to an analysis of the alternative approaches of the accountant.

As previously mentioned, the traditional accounting approach to income measurement is an *ex post* one, involving a comparison of sales revenues with related costs through the so-called 'matching' process. Accounting income is recognised, with certain well-defined exceptions, when revenue is realised – the so-called realisation principle. This process, whilst appearing eminently sensible, practical and objective, has several drawbacks. Firstly, the basis of measuring transactions involving historic costs, together with the related realisation principle, prevents the reporting of significant unrealised income elements, and results in the periodic reporting of a heterogeneous mixture of enterprise gains and losses; some relating to the current period and others to previous periods. If *ex post* measures of enterprise income are believed to be useful indicators of periodic business performance, both for control and predictive purposes, it can hardly be argued that the measures which are reported currently are particularly useful in these respects – income earned during the period concerned is not fully reported; contemporary values for all resources of the enterprise are not reported; and the reported income measure contains gains and losses earned in previous periods.

It is no argument to suggest that the traditional measure of accounting income is a stewardship measure and is not intended for decision making.[11] Present-day financial reports appear to be used mainly in practice for purposes of decisions and, in any case, the stewardship function implies the making of decisions in order to control the activities of management. It is doubtful if an income measure which, because of an inherent conservatism,[12] presents an incomplete and misleading mixture of income elements, can provide useful information to persons desiring knowledge of company performance during the period to which the income measure purports to relate.

The imperfections of the traditional accounting income model have given rise, over the years, to a number of pleas for alternative accounting models which attempt to minimise its most obvious faults. These arguments have been mainly for the so-called current value models; where income is derived using current price based values – that is, either buying prices in terms of current replacement costs[13] or selling prices in terms of current realisable values.[14] The income model based on replacement costs attempts to derive income when capital is maintained in terms of the physical resources underlying it. The realisable value model, on the other hand, derives income following a maintenance of capital in terms of what the company is sacrificing by keeping its resources in their existing form rather than in a next best alternative form such as cash.

Both current value based income models produce what can be radically different measures of income when using the same enterprise transactions. The differences arise because of the different value concepts which are applied to the measurement of capital. Nevertheless, both contain points of similarity which are worthy of note.

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[9] A. A. Robichek and S. C. Myers, *Optimal Financing Decisions*, Prentice-Hall, 1965, pp. 18–19.

[10] For a discussion of the *ex ante* and *ex post* models and of 'windfalls' see Hicks, op. cit., or Hansen, op. cit.

[11] See 'Accountants' Liability to Third Parties', *Statement S8*, The Institute of Chartered Accountants in England and Wales, 1965.

[12] For a discussion of the convention of conservatism, see R. R. Sterling, 'Conservatism – The Fundamental Principle of Valuation in Traditional Accounting', *Abacus*, December 1967, pp. 109–132.

[13] According to the model proposed in E. O. Edwards and P. W. Bell, *The Theory and Measurement of Business Income*, University of California Press, 1961, and practised in The Netherlands – see A. Goudeket, 'An Application of Replacement Value Theory', *The Journal of Accountancy*, July 1960, pp. 37–47.

[14] According to the model proposed by R. J. Chambers, *Accounting, Evaluation and Economic Behaviour*, Prentice-Hall, 1966; and R. R. Sterling, *Theory of the Measurement of Enterprise Income*, University of Kansas Press, 1970.

They both abandon the traditional accounting principle of historic cost, because of the use of current valuations, and they both ignore the restrictive realisation principle. Thus, they present the realised and unrealised gains and losses of the defined period rather than a misleading mixture of income elements, as is the normal case with the traditional model. They also incorporate gains or losses resulting from operating activity as well as from the holding of resources. This separation of income elements is believed to have merit because it may well enable the decision maker to differentiate for predictive purposes, between gains which are normally within the effective control of management and those which are not.

As the foregoing remarks have indicated, each accounting model produces what can be significantly different measures of enterprise income. This raises the questions of what exactly is the income of the enterprise, and of which model provides the best indication of it, for it can be defined and measured in a variety of ways, each measure depending on the particular definition of capital to be maintained and, thus, the valuation concept to be applied. The historic cost model attempts to maintain the original money capital subscribed and retained in the enterprise; the replacement cost model involves maintenance of the physical resources underlying capital; and the realisable value model involves maintenance of capital which could be invested in an alternative form. The problem with current value accounting, therefore, is that it adds two further concepts to that already employed in practice; further complicating the issue of how best to report on enterprise activity.

One further extension of this discussion can also be made at this stage. The foregoing paragraphs have concentrated on accounting models which are all *ex post* measures of enterprise income. The Hicksian economic approach to income, on the other hand, acknowledges that there are two time dimensions in a world of uncertainty – the past and the future. Thus, the economist uses both an *ex post* and an *ex ante* model to analyse economic behaviour. The accountant, too, can produce *ex ante* measures of income by budgeting or forecasting future enterprise activity. He can do this within the terms of any of the historic cost, replacement cost, and realisable value models, by forecasting enterprise transactions and capital movements in any of these valuation terms. The computation of an *ex ante* historic cost income measure is required presently in certain takeover or merger situations in Britain due to the provisions of the City Code on Takeovers and Mergers. It is simply a logical extension of this practice to consider similar *ex ante* computations in current value terms. However, *ex ante* accounting income, no matter what its valuation base is, will create the forecasting problems which appear to negate the practical usefulness for financial reporting purposes of the economic models of Hicks.

The elusive nature of reportable enterprise income is further complicated by the relaxation of the traditional accounting measurement assumption of a stable monetary unit.[15] If the reality of a monetary unit with a fluctuating value (in terms of its generalised purchasing power) is introduced into each of the aforementioned accounting models of income, then an equivalent number of further income models emerge – that is, for each accounting model, there exists an adjusted and an unadjusted measure of income. (Adjusted in this sense means that the income measurement process has been undertaken allowing for changes in the generalised purchasing power of the monetary unit used; in other words, the so-called inflation accounting which is being advocated presently by the Accounting Standards Steering Committee.)[16]

The concept of reportable enterprise income cannot therefore be regarded as a straightforward issue; there are just too many variations to be considered, each raising the question of what exactly is the periodic income of an enterprise given a certain set of circumstances.

Flexibility of Accounting Principles

The validity of the enterprise income concept as a useful part of the corporate financial reporting function is brought further into focus when the question of applying accounting principles in the measurement process is raised.

In each of the historic cost and current value income models, the emphasis is entirely on enterprise performance using measurements of known or forecast economic transactions of the business enterprise. In order to construct these various measures, accountants have devised a series of measurement guidelines or principles which implement the so-called process of accrual accounting so necessary to the periodic matching of revenues and costs – that is, accounting principles related to such matters as the need to depreciate fixed assets; provide for inventory of unsold stocks and work in progress; amortise research and development costs; defer taxation liabilities; aggregate the financial results of a group of companies; account for the consequences of a takeover or merger; and so on. However, whereas there can be a great deal of uniformity of meaning in these general principles, there is also a great deal of flexibility in their execution in practice.[17] Consider, for example, the problem of accounting for stocks and work in progress, a matter which affects materially the computation of the periodic income figure – whether this is based on historic costs, replacement costs or realisable values. In the historic cost model, there is the problem of defining inventory cost. Each definition brings a different value and a different measure of income – even within the same conceptual definition of income. The same issue does not arise with the current value models because of their use of replacement costs or realisable values, but they are affected by related issues – for example, should replacement costs or realisable values be applied to individual items or to batches of stock; should overheads be included in the replacement cost figure, and, if so, to what extent (this issue also affects the historic cost model); what replacement costs should be used when the nature of stock items is changing due to technological developments; what realisable values should be used – should they be related to the existing or future state of the stock? In other words, within each defined accounting income model, there are a variety of possible income measures depending on the particular accounting methods used to implement the accounting principles adopted to measure income. This is no new problem; indeed, it has been recognised for a long time by accountants[18] and, recently, at least within the context of the historic cost model, the professional accountancy bodies in Britain have commenced work on trying to narrow the areas of possible differences.[19] This notwithstanding, it is inevitable that a significant degree of flexibility will remain, which raises further doubts about the validity of a concept, which is not only capable of differences in interpretation and measurement because of variations in capital and value concepts, but is also subject to differences due to an inevitable flexibility in measurement procedures.

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[15] See, for example, Edwards and Bell, op. cit., pp. 12–23 and 233–269; R. S. Gynther, 'Accounting for Price Level Changes – One General Index or Several Specific Indices?', *Accountancy*, July 1962, pp. 560–564; R. L. Mathews, 'Income, Price Changes and the Valuation Controversy in Accounting', *The Accounting Review*, July 1968, pp. 509–516; K. Shwayder, 'The Capital Maintenance Rule and the Net Asset Valuation Rule', *The Accounting Review*, April 1969, pp. 304–316; and Sterling, op. cit., pp. 331–351.

[16] 'Accounting for Changes in the Purchasing Power of Money', *Provisional Statement of Standard Accounting Practice* No. 7, May, 1974

The Problem of Subjective Judgment

The previous section dealt with that aspect of the elusive nature of the enterprise income concept relating to the flexibility of accounting practice because of the application of so-called generally accepted accounting principles. There is one further aspect of accounting practice, which arguably introduces the greatest degree of flexibility in income measurement. This relates to the application of subjective judgment by management and accountants during the income measurement process.

It is an inevitable aspect of financial accounting practice that the measurement process which is undertaken to derive periodic income contains a great deal of subjective judgment, particularly from the point of view of resource valuation. As a consequence, it is not unfair to suggest that subjective judgment, albeit of an expert and experienced kind, has a great deal of influence on the resultant capital and income measures. For example, personal opinions have to be formed regarding provisions and write-offs of bad debts; provisions for damaged or obsolete stock; the depreciable life-time of fixed assets; the amortisable life-time for research and development costs; and the provision of creditor liabilities when these are not determinable accurately at the reporting date. In addition, a great deal of subjective judgment may be required in both current value models when replacement costs and realisable values are not readily ascertained from recent market transactions, price lists, contracts, etc. The application of general price-level techniques to account for the inflationary element of value increments in income measurement also can contain a great deal of personal judgment on such matters as determining dates of acquisition of fixed assets, particularly when these are very old as in the case of land and buildings, or in choosing the appropriate type of index for adjusting capital to segregate the effects of inflation. In addition to the foregoing comments, there are the obvious problems which face the accountant should he decide to extend his time horizon into the future in order to compute measures of *ex ante* accounting income. Not only does he have to cope with the subjective judgments mentioned above, but he also has to meet the judgmental problems of forecasting transactions, values, etc.

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[17] R. J. Chambers, 'Financial Information and the Securities Market', *Abacus*, September 1965, pp. 3–30; and E. Stamp, 'Reforming Accounting Principles', in E. Stamp and C. Marley, *Accounting Principles and the City Code: the Case for Reform*, Butterworths, 1970, especially pp. 129–140.

[18] The then American Institute of Accountants and the New York Stock Exchange were actively concerned with the problem in the 1930s; and the Accounting Principles Board of The American Institute of Certified Public Accountants, established in 1959, was primarily directed to combat it.

[19] Through the Statements of Standard Accounting Practice evolving from the work of the Accounting Standards Steering Committee.

These personal judgments normally have to be made by experts in the appropriate area – for example, engineers and production managers. However, such opinions are sought because of a lack of verifiable, objective evidence, and the possible variations in an opinion on a particular factor may thus be immense. The effect is to accentuate the possible flexibility in income measurement to extents which may cause income measures to be wide open to question because of doubts relating to the lack of objectivity exercised in their derivation. Thus, despite the laudable efforts of the professional accountancy bodies to minimise variety in accounting practice, it still remains a fact of life that no one can regulate against flexibility due to subjective judgment. Needless to say, this is hardly a point in support of income as such an important aspect of the corporate financial reporting function.

Significant Resource Omissions

In both accounting and economics, the relationship between income and capital is well established and accepted – one of the main differences between the approaches of the two disciplines being that the economist computes capital in order to derive income, whereas the accountant traditionally computes income with capital being the residue of such an exercise.[20] Whatever the approach, however, one point of similarity emerges – periodic income can be interpreted in terms of the periodic change in the value of capital. This means that, so far as enterprise income is concerned, it is important to ensure that capital is measured fully – that is, that its value takes cognisance of all economic resources which contribute to the existence of income. However, if the historic cost and current value income models are examined, it is clearly seen that the relevant capital computations are incomplete; that in most situations enterprise capital is computed on the basis of an aggregation of resource valuations which have arisen from past transactions and events. This means that significant enterprise resources may well be omitted from the relevant capital and income computations. This entire problem has been discussed elsewhere[21] in connection with accounting for goodwill; goodwill being the term used to cover such intangible business resources as development projects, secret processes, franchises, licences, patents, trade marks and copyrights, efficient management, efficient and skilled labour, good industrial relations, sound training schemes, a high community standing, high quality products and services, and so on. What experience shows is that goodwill becomes part of enterprise capital for accounting purposes normally when there is payment for such an item as part of a business combination. Even then, it can be avoided by techniques of so-called pooling accounting.[22] Goodwill, however, exists in any business enterprise at any time in its lifetime, and sums of money are expended constantly to maintain or augment a positive value for it. Nevertheless, the traditional practice of accountants is to ignore the existence of goodwill unless this is unavoidable due to a business combination, in which case indications are that the majority of companies prefer to write off the relevant acquisition costs against income or capital (that is, by writing it off to reserves).[23]

Any expenditures incurred on augmenting the resources underlying goodwill are treated as costs in determining periodic accounting income. The question of ignoring goodwill, which certainly is the case with the historic cost income model, would almost certainly arise with both the current value based models, in either their *ex post* or *ex ante* forms.

The above comments lead to the apparent conclusion that the accounting models for determining periodic enterprise income are somewhat less than adequate because capital computations are incomplete. In addition, matchings of related sales and costs may result in overstated costs due to expenses incurred on the creation of goodwill being written off rather than capitalised.

The meaning of enterprise income

If, as the evidence clearly suggests, income is a major part of the present corporate financial reporting system, it is also clear that it should have some precise meaning; particularly from the point of view of those persons using it as part of their investment activities. Surprisingly, despite its long history and the extent of its current use, the concept of enterprise income has remained ill defined, if it has been defined at all. The following comments and quotes are given as brief illustrations of this assertion:

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[20] For such a comparison, see Solomons, op. cit., pp. 374–383 and Hansen, op. cit. pp. 57–63.

[21] T. A. Lee, 'Goodwill: an Example of Will-o'-the-Wisp Accounting', *Accounting and Business Research*, Autumn 1971, pp. 318–328.

[22] See A. T. McLean, *Accounting for Business Combinations and Goodwill*, The Institute of Chartered Accountants of Scotland, 1972.

[23] For evidence of this point, see T. A. Lee, 'Accounting for Goodwill: An empirical study of company practices in the United Kingdom – 1962 to 1971', *Accounting and Business Research*, Summer 1973, pp. 175–196.

Arthur Andersen and Company[24] implied a definition of enterprise income in a recent publication:

> 'The purpose of the statement of income is to provide a summary analysis of the significant events and factors that give rise to an increase or decrease in the net economic resources of a business enterprise for a period of time other than those changes resulting from additional investments by, or distributions to, the owners'.
>
> 'Perhaps more than any other, the statement of income is used in an attempt to assess the future. Past performance with respect to earnings may prove to be an indicator of future performance'.

These statements suggest that income represents a periodic change in enterprise resources, and is of use as an indicator of future performance. However, this merely begs the question because the terms 'resources' and 'performance' then require to be defined. Chambers[25] appears to have used the same approach when he identifies income as one of the reasons for periodic changes in capital. But, whilst defining capital and the process of capital maintenance, he fails to provide a useful definition of income. For example, he describes it typically as follows[26]:

> 'Under static conditions (there being no change in the price level or in specific prices and excluding new contributions and withdrawals by constituents) income of the period (t_0, t_1) is the difference between the measures of capital at t_1 and t_0, . . .'.

This type of approach to the meaning of income is not exactly a recent one. Macneal,[27] for example, stated that:

> 'There is one correct definition of profits in an accounting sense. A profit is an increase in net wealth. A loss is a decrease in net wealth. This is an economist's definition. It is terse, obvious, and mathematically demonstrable'.

The question of what is meant by 'wealth' is raised, and the meaning of income remains in doubt. The situation is no better in the professional literature. For example, Sprouse and Moonitz[28] state:

> 'Net profit (earnings, income) or net loss for an accounting period is the increase (decrease) in owner's equity, assuming no changes in the amount of invested capital either from price-level changes or from additional investments and no distribution to the owners'.

Grady, on the other hand, failed to provide any contemporary definition, indicating[29] that:

> 'It is important that accountants keep in the forefront of any discussion of income, its composite nature as the resultant of positive (credit) and negative (debit) elements'.

It is obvious from even this brief look at the accounting literature that, whereas most writers are agreed that income is a derivation of the periodic change in enterprise capital, the exact meaning of the term is assumed either to be so self-evident as to require no further explanation, or to be explained adequately in terms of the way in which it is measured. By way of contrast, economists are much more particular about the definition they use. Fisher[30] described it as a series of perceived events or psychic experiences called enjoyment – that is, consisting of 'those final physical events in the outer world which give us our minor enjoyments'. Hicks[31] went further than this by adding the element of saving to consumption:

> 'The purpose of income calculations in practical affairs is to give people an indication of the amount which they can consume without impoverishing themselves. Following out this idea, it would seem that we ought to define a man's income as the maximum value he can consume during a week, and still expect to be as well off at the end of the week as he was at the beginning'.

This well-known definition of income does not attempt to define income simply in terms of changes in capital; it looks at income in a much more fundamental way – as the so-called 'guide to prudent economic conduct'. As such it has been accepted by economists as the basis for analysing personal economic behaviour; and it has even been stated and used within the accounting context[32] as a basis of an explanation of accounting income – for example, that the income of a company is the maximum amount it can distribute whilst maintaining its capital intact. What can be said at this stage, therefore, is that the typical Hicksian economic definition of income, either in its original personal form or in its adapted entity form, reveals that income is no more than a conventional economic indicator of human or entity behaviour – such behaviour relating to prudent consumption and capital maintenance. This point is not brought out in the typical accounting definitions which concentrate mainly on the computational properties of the concept.

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[24] Arthur Andersen and Co., *Objectives of Financial Statements for Business Enterprises,* privately published, 1972, p. 65.

[25] R. J. Chambers, *Accounting, Evaluation and Economic Behaviour,* Prentice-Hall, 1966, pp. 103–123 and 220–226.

[26] Op. cit., p. 264.

[27] K. Macneal, *Truth in Accounting,* Scholars Book Co., 1970 reprint, p. 295.

[28] R. T. Sprouse and M. Moonitz, 'A tentative set of broad accounting principles for business enterprises', *Accounting Research Study No. 3,* American Institute of Certified Public Accountants, 1962, p. 54.

[29] P. Grady, 'Inventory of Generally Accepted Accounting Principles for Business Enterprises', *Accounting Research Study No. 7,* American Institute of Certified Public Accountants, 1965, pp. 410–412, at p. 411.

[30] Fisher, op. cit., pp. 3–4.

[31] Hicks, op. cit., p. 172.

The concept of enterprise income is no more than a man-made conventional symbol or indicator of economic conduct. It can therefore be thought of in the familiar terms of financial prudence and the ultimate survival of the enterprise – that is, as indicating the most appropriate consumption or distribution policy to be adopted if the enterprise is to survive and its owners are to be satisfied.

However, the above having been said, it is evident that income can be interpreted in a variety of ways. (Much of the following commentary stems from the work of Hendriksen,[33] who, without doubt, is one of the few accounting writers who has attempted to look at the variety of meaning attributable to enterprise income in some detail.)

Firstly, income can be interpreted as the 'flow' of gains or benefits from a 'stock' of capital, following the Fisher tradition.[34] This view of income is commonly adopted by accountants for purposes of differentiating between income and capital, particularly when establishing rates of return on capital which can be used as indicators of the effective use made of the resources underlying capital. It arose presumably from the stewardship approach to financial reporting, where there is an evident need for management to account for the use of economic resources entrusted to it, as well as a need to determine the income and capital rights of individual or groups of owners, both when the enterprise is a going concern, and when it is ultimately realised. However, there is a significant doubt regarding the meaningfulness of interpreting income as a 'flow' from a 'stock' of capital. Much depends on the classification for accounting purposes of expenditure which has ceased to have a useful service potential from that which still has.

Secondly, following on from the above point, it is evident that enterprise income is believed to be indicative of the efficiency of management in connection with the holding and operational use made of the economic resources entrusted to it. The computation and use in investment analysis of financial relationships such as earnings per share, price earnings ratios, gross margins and net margins supports this point, and the typical interpretation of these indicators is that, comparatively, the higher the level of reported income, and the higher the resultant rates of return, etc., the more efficient and effective management may be assumed to be.

> 'In our complicated, changing world, it is not really possible to distill a whole year's operations of a vast business enterprise into a single, absolute figure. The public, however, doesn't always appreciate this. Thus, the annual net earnings figure tends to have a magical significance – not only for the ordinary investor but for security analysts and even for aquisition-minded managements. It becomes, in effect, what grades are for the students – a measure of excellence or lack of excellence, of progress or lack of progress.'[35]

Apart from the doubts which have already been discussed regarding the computation of the necessary income and capital measures, there must also be doubt regarding the meaning of enterprise income as an indicator of managerial performance. The term 'efficiency' is open to a variety of interpretations, depending on the enterprise attribute to which it refers – for example, does it refer to the level of operational productivity, the quality of goods or services produced, the use made of machines or labour, the effect of operations on the quality of the environment, or what? 'Efficiency' also depends on the objectives which have been set for management – for example, were these to produce a reasonable return on investment or to go all out to maximise the return? Unfortunately, there is little or no evidence to suggest that enterprise objectives are made so explicit to investors and other interested groups.[36] There is evidence to suggest that managerial effectiveness and efficiency may well be being judged in the light of enterprise objectives which do not necessarily have a direct relationship to the traditional income objective[37]

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[32] Solomons, op. cit., p. 378.

[33] E. S. Hendriksen, *Accounting Theory*, Irwin, 1970, revised edition, pp. 124–130.

[34] Fisher, op. cit.

[35] 'What are Earnings? The Growing Credibility Gap', *Forbes*, 15 May 1967, p. 29.

[36] The Companies Acts 1948 and 1967, which govern the publication of annual corporate financial reports at the present, contain no such statement of objectives.

[37] T. W. McRae, 'The Behavioural Critique of Accounting', *Accounting and Business Research*, Spring 1971, pp. 85-86.

– that is, social and economic considerations, such as the quality of life, are increasingly being regarded as important aspects of managerial behaviour.

Thirdly, reported enterprise income has, despite statements to the contrary,[38] been used by investors as an investment predictor – witness the rapid growth in Britain of the disclosure and use of 'earnings per share' and 'price-earnings' measures which are specifically designed for this purpose. In other words, it may be presumed that the investment community finds measures of past enterprise income of use in predicting future income levels in order to predict the level of future distributions of dividends which, at least in part, determine share prices. Certainly, some knowledge of the past is useful when predicting the future, as it is the past and current situations which develop into those of the future. However, the volatility of enterprise activity may well be an important factor in determining whether past income levels, and rates of change in these levels, are likely to persist in the future. The empirical findings to date are confused and conflicting – Rayner and Little[39] concluding that there is no evidence to suggest that above average growth in income levels in the past will be repeated in the future, whilst Singh and Whittington[40] found that above average income levels can persist. Whittington also concluded in a recent study[41] that average income levels tend to persist in the future, but not to the same extent as in the past. The prediction of future income levels, certainly from the point of view of individual companies, appears, therefore, to be an indeterminate factor. As Hendriksen[42] has stated:

> 'But just as the weatherman observes recurring and non-recurring patterns and looks for signs of change, so the investor must analyse the recurring nature of the favourable and unfavourable aspects of operations and observe other factors which are likely to cause changes in incomes. While historical net incomes are valuable in making predictions regarding future incomes, the prognosticator should analyse the favourable and unfavourable aspects, including only those items that are recurring by nature'.

In other words, it appears that, within the context of the meaning of income, income can be interpreted as a device of use in predicting future dividend levels, but that this implication has attendant disadvantages in the sense that the past need not necessarily repeat itself in the future; although the 'average' past may well persist into a similar 'average' future.

The interpretation of reported enterprise income as a significant financial indicator of enterprise and managerial performance appears to be the most usual meaning to be attributed to it. However, as the above comments have tried to indicate, there are differing interpretations within the 'financial indicator' category, each of which is open to some questioning due to either a possible lack of standards or definitive yardsticks, or a lack of conclusive empirical research findings. Because of this, it is hard to lend to enterprise income a meaning which has any general acceptance. It is therefore understandable that it is so often interpreted in terms of its measurement and computation rather than in terms of its fundamental purpose which is as a tool of financial management.

Information needs of investors and others

This section is concerned with what is arguably the most significant question to be asked of the concept of reportable enterprise income – that is, are accounting measures of enterprise income relevant to the needs and requirements of those persons using corporate financial reports? Clearly, it must be concluded that measures of historic cost based income have been, and still are, assumed to be of use to shareholders and other persons interested in the affairs of companies, simply because of the past and current emphasis which is placed upon such measures in the function of financial reporting. But are they, or the alternative current value based measures, of value to the persons who are assumed to use them?

It is a relatively self-evident observation that a variety of persons are interested, in varying degrees, in an individual company and, therefore, require periodic information of its economic activity and financial affairs. This point appears to be recognised fairly generally in the literature,[43] the main group of users usually being identified as those who have a known or potential investment commitment with the company – that is, shareholders, lenders and creditors.

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[38] *Statement S8*, op. cit.

[39] A. C. Rayner and I. M. D. Little, *Higgledy Piggledy Growth Again*, Basil Blackwell, 1966, pp. 76–81.

[40] A. Singh and G. Whittington, *Growth, Profitability and Valuation*, Cambridge University Press, 1968, pp. 133–134.

[41] G. Whittington, *The Prediction of Profitability and Other Studies of Company Behaviour*, Cambridge University Press, 1971, pp. 82–104.

[42] Hendriksen, op. cit., pp. 129–130.

[43] For example, G. O. May, 'The Nature of the Financial Accounting Process', *The Accounting Review*, July 1943, pp. 189–193; and The Committee to Prepare a Statement of Basic Accounting Theory, *A Statement of Basic Accounting Theory*, American Accounting Association, 1966, pp. 20–23.

However, the various legislative provisions regulating company activity have, for many years, recognised solely the right of shareholders to receive regular information about the financial affairs of companies in which they have invested.

This form of statutory provision for financial information has been made in order to comply with the requirements that company management reports periodically to ownership on the way it has utilised the resources entrusted to it – the traditional stewardship accounting – an objective of corporate financial reporting which is supported by The Institute of Chartered Accountants in England and Wales.[44]

Thus, traditional corporate financial reports to shareholders are deemed to be part of the managerial stewardship function, and are apparently not intended for decision making. This notwithstanding, both existing and potential investors do make use of such reports for investment purposes and, indeed, it is hard to conceive of even the stewardship function without also thinking of decisions, for the use of stewardship orientated information must inevitably lead to some form of decision, even if this is to do nothing. Thus, it does not appear to be unfair to suggest that the use by investors and others of any financial information reported by a company must result in some decision or another. In addition, it must be stated that corporate financial reports, due to the legal requirements of registration and filing, become effectively public information and, consequently, are of use in an indefinite number of decision situations connected with the companies concerned. Thus, it appears that the validity of reportable accounting income measures must be looked at in the light of the foregoing remarks – that is, in connection with their relevance to the process of investment decision making. However, such a review is not as simple as it may look at first sight:

> 'A review of literature by committees of leading accounting organisations and by individuals who have given lifetimes of serious thought to accounting reveals that surprisingly little attention has been paid to the objective of providing information for investment decisions. Accounting writers frequently mention owners, stockholders, creditors, or some other sub-classification of investors as readers of financial statements, but they seem to have made no special effort to show the relation between accounting and problems facing investors. Rather they have assumed that there is a relation without having bothered to analyse the problems of investors with a view to specifying just what information can be provided by accountants and also be useful to investors'.[45]

This section is concerned, therefore, with looking at the nature of decisions made by investors in particular, and the financial information which may be required to satisfy them. (The term 'investors' is intended to cover potential and existing shareholders in a company; the question of lenders, creditors, etc. will be discussed at a later stage.)

From a study of the relevant business finance and investment literature[46] it appears that the most favoured assumption regarding the objectives of the individual investor is that he attempts to maximise the value of his command over resources, both over time and in terms of cash – cash, rather than measures of enterprise income, representing his capacity to consume and command resources.

> Thus, it has been further assumed, without the existence of significant evidence to the contrary, that: 'Investors commit assets to the undertaking with the expectation of being repaid a larger amount of assets in the future'.[47]

It can then be argued that, in order to maximise the value of his consumption over time, the typical investor must assess the alternative courses of action available to him, these being centred on a choice of current or future consumption – that is, whether to consume currently available cash or to delay such consumption by investment, the value of such investment being determined according to the personal valuation model developed from the Fisher tradition; that is,

$$V = \sum_{t=1}^{n} \frac{D_t}{(1 + i)^t}$$

where V is the present value of the relevant shareholding, D is the dividend expected to be received at each point in time (including the eventual realisation proceeds) and i is the investor's time-preference rate for discounting purposes.

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[44] *Statement S8*, op. cit., para 8(b).

[45] G. J. Staubus, *A Theory of Accounting to Investors*, Scholars Book Co., 1971 reprint, p. 3.

[46] For example, this is implied throughout Robichek and Myers, op. cit., and, particularly, pp. 2–4; the same implication is to be seen in R. J. Briston, *The Stock Exchange and Investment Analysis*, George Allen and Unwin, 1970, pp. 459–460; but it is made explicitly in J. Freear, *Financing Decisions in Business*, Accountancy Age Books, 1973, pp. 9–11. It should be noted that this is a typical and familiar assumption only; it has yet to be fully tested and proved in practice. It should also be noted that the term 'command over resources' represents capacity to consume and, as such, in this context includes potential dividends and realisable share values.

[47] Staubus, op. cit., p. 11.

To the existing investor, this assessment involves a consideration of the following alternatives:

(1) To continue to invest in the company concerned, thereby deferring consumption; in this case, future cash flows from the investment are crucial to the decision.

(2) To realise in total his investment and consume the proceeds, thereby opting for immediate consumption; in this case, the realisation proceeds are relevant to the decision.

(3) To realise in total his investment and reinvest the proceeds either in whole or in part; in this case, the realisation proceeds of his existing shares, the purchase prices of alternative investments, and the future cash flows from alternative investments would aid the making of the decision.

(4) To realise in part his investment and reinvest the proceeds in whole or in part; in this case, the realisation proceeds of his existing shares, the future cash flows from the continuing partial investment, the purchase prices of alternative investments, and the future cash flows from alternative investments would all impinge upon the decision.

Thus, so far as concerns the company in which the investment is held, the reportable financial information required by the investor for purposes of his decision would appear to be that related to the realisable value of its shares and to its potential dividend flow; and, in particular, a requirement for some form of financial information which aids him in determining what the potential dividend flows might be. So far as alternative investments are concerned, it would appear that the same financial information requirement also holds. Thus, the total information requirements of the existing investor relate to current purchase and realisation values (which, in the usual case, are determinable other than by the investor) and the computation of present values in terms of discounted future dividend and realisation flows (which, by definition, must be determinable by him). In other words, the existing investor's information needs mainly involve several values for comparative purposes – that is, comparisons of the present value of the existing investment with the current realisable value; possibly, of the present values of alternative investments with their current purchasing values; and, possibly, of the realisation proceeds of the existing investment with the potential acquisition costs of alternative investments. Whatever the particular value comparison and, thus, whatever the particular investment decision, it appears that the existing investor should receive reportable financial information of relevance to his perception of future dividend flows from the various enterprises, assuming he has, in addition, access to information concerning the current purchasing and realisation values of the shares being assessed.

The potential investor's decisions involve assessments of alternatives which are similar to those of the existing investor, with the exception of the alternatives related to the continuation or cessation of an existing investment. Certainly, his information needs are connected with personal computations of present values of various alternative shareholdings using estimated future dividend and realisation flows. Thus, it appears that the corporate financial reporting system should be aimed at providing information of use in estimating these flows. The question is whether or not an enterprise income-orientated reporting system satisfies this goal – that is, whether or not measures of historic cost or current value based income are useful to the investor when he is attempting to predict future dividends for purposes of computing relevant share present values.

Dividend payments appear to require an assessment of two factors – the availability of distributable enterprise income, and the availability of cash to satisfy the eventual payments. The first factor is the familiar legal one of ensuring that dividends are not repayments of subscribed capital;[48] and the second factor is the common-sense one of financial prudence, depending to a considerable extent on the need for the enterprise to retain liquid resources to maintain and expand its existing operations. So far as the legality of dividends is concerned, there does not appear to be an absolute need for income figures to ensure the appropriate maintenance of subscribed capital. Indeed, this particular point can be established by means of relatively simple statements of cash movements since the original subscription – dividends only being payable out of cash generated from sources other than share and loan issues. In addition, for purposes of financial prudence when paying dividends, statements of measured enterprise income appear to be a complete irrelevance, as the key factor is the availability of cash rather than the availability of so-called distributable income. Thus, from the point of view of assessing possible dividends, it appears that the availability of cash from operational or trading sources is the most significant matter, and that periodic income, although traditionally used in this exercise, is not as relevant as its past use in this context indicates. It therefore could be concluded that the investor requires financial information relevant to the prediction of future dividends, and that information concerning periodic income may not be as relevant for this purpose as is generally assumed.

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[48] It should be noted that the legality of dividend payments, according to the decisions of previous court cases, appears to refer to the maintenance of subscribed capital rather than to existing capital inclusive of retained income, etc.

Before dealing with the information needs of persons other than investors, one further point should be made in connection with the use of accounting income measures as a basis for dividend prediction. It should be remembered that the measures which have been used in practice to date have all been historically based – that is, historical not just in terms of the valuation basis, but also in terms of the economic activity which is being described. Thus, the investor, who apparently must predict dividend flows in order to make his subjective valuation of relevant shareholdings, is given measures of past income which would require to be used to predict future income levels, in order to further predict future dividend levels. The question which this point raises is, not merely whether the concept of income is relevant to investment decisions, but whether measures of past income are reasonable indicators of future income measures and of future dividend levels. As previously mentioned, the existing empirical evidence on the question of predicting future income is inconclusive.[49]

Investors are not the only persons interested in the financial progress and affairs of the company. Lenders and creditors, for example, are two groups who 'invest' funds in it and, consequently, require to manage their 'investments'. Their information needs, however, appear to centre on the cash position of the company – that is, the availability of cash resources to enable the enterprise to meet its relevant interest and repayment commitments. In this respect, enterprise income does not appear to be a significant factor in helping lenders and creditors to predict future liquidity positions. Rather, it is the cash-generating potential of the company which is likely to interest them: not its income-generating potential.

Finally in this section, the information requirements of a further group of users of corporate financial information should be noted – that is, the Inland Revenue. The entire system of corporate taxation in Britain, as in other developed countries, is based on an assessment of periodic enterprise income. Historic cost accounting income has been used for many years as the basis for computing company taxation liabilities. It would therefore appear to be the case that, subject to radical changes in the basis of computation of tax, income must remain of primary importance in this respect – despite the faults and problems associated with its use in other areas. But it must be stated that taxation of companies need not necessarily be based on their measured income. It is simply convention and habit that supports the present practice.

Summary to date

This essay has concentrated on what the writer regards as several major defects in the concept of enterprise income. Because of the length of the essay, however, it may well be useful to the reader to pause to reflect on a summary of the main points made, before proceeding further. The following comments are therefore intended as such a summary:

(1) Enterprise income is a many-sided concept. There is no such thing as *the* concept of income. Entirely different measures of periodic income are possible despite the use of the same set of economic circumstances. Thus, it is exceedingly difficult to determine precisely the periodic income of the business enterprise. Unfortunately, the concepts of income which seem the most appropriate in theory (that is, the economic models) are the least measurable in practice.

(2) The concept of enterprise income has remained a relatively ill-defined aspect of accounting, despite its prominence in the practice of financial reporting. It is defined traditionally in terms of its measurement and computation rather than in terms of its underlying meaning. However, it can be explained as a conventional symbol for enterprise (and management) success or failure, and as an investment indicator of enterprise performance in the future. There are, however, significant reasons for questioning the interpretation of income in such ways.

(3) When looking at the informational needs of investors and others, it is apparent that, in the case of investors, these centred around data of use in the process of valuation for decision making purposes and, in the case of lenders and creditors, around data of use in the process of evaluating enterprise potential for meeting its known commitments. In both these instances, accounting data reflecting the cash situation of the enterprise appears to be more valuable than that describing its periodic income.

The foregoing remarks do not reflect well on the concept of enterprise income; it is subject to a great deal of variation in both its conception and practice; its measurement is open to criticism; its meaning is imprecise and it does not appear to be entirely appropriate to the economic factors it is intended to symbolise; nor does it appear to be entirely relevant to the majority of persons who may be assumed to be using it. As the objective of accounting is to provide financial information which is relevant to the needs of its users,[50] it therefore is appropriate to look a little more closely at this point and, particularly, to see if there is an alternative form of financial report which may eventually supplant the income statement.

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[49] See references in footnotes [39], [40] and [41].

An alternative to income reporting

The problem with enterprise reporting systems which concentrate on measures of income is that they tend inevitably to focus accountants' attention on the very significant problems associated with income determination and asset valuation. In other words, there is the danger that other relevant forms of financial reporting may be neglected, thus placing income reporting in a place of prominence which is not fully deserved or justified. The purpose of this section, therefore, is to look at one alternative which appears to have as much, if not more, relevance to investors and others interested in the financial affairs of companies – the system of so-called cash flow reporting.[51]

In the previous section dealing with the information needs of investors and others, it was suggested that all such groups, despite their differing interests in companies, were concerned, generally, with the future development and progress of these enterprises; and, particularly, with their ability to pay dividends and interest, and repay liabilities, over what could be a considerable period of time. This would further suggest that investors, etc. require information which reflects these factors. The question posed is whether the traditional income statement, together with its supporting balance sheet, are sufficient for this purpose.

The income statement and the balance sheet, whatever the valuation basis used, cannot be expected to reveal the full picture of how the company is developing and progressing over time. The income statement portrays a periodic measure of operational activity, and the balance sheet reflects the company's resultant financial position at one point in time. The inevitable information gap which exists because of the limitations of these two statements has resulted in an increasing use in recent years of a further financial report – that is, the funds statement, which is intended to show periodic changes in the sources of finance available to the company as well as the ways in which the resultant funds have been employed by it.[52] It is this type of dynamic report which appears to have relevance to a person assessing and predicting the financial progress of an individual enterprise over time. However, funds flow reports contain one very significant limiting factor – they are based upon the concept of enterprise income and its supporting system of accrual accounting.

Thus, the flow of funds depicted in such statements contains all the measurement faults and problems associated with income determination. Despite this problem, nevertheless, the concept of reporting on the flow of enterprise funds appears to have great relevance to investors, lenders and creditors, and should be pursued further.

In the opinion of the writer, there is one economic factor which is crucial to a proper assessment of the dividend potential, etc. of the enterprise and that is its capacity to survive as an enterprise – indeed, it could be argued that survival should be the primary enterprise objective. If the enterprise does not survive over the long-term, there will be no flow of dividends, no payment of interest, and no repayment of loans and other amounts due. Therefore, it can be argued that investors and other interested parties require information which enables them to assess and predict the development and progress of the individual business enterprise over time; its capacity to survive over time; and its capacity to pay its dividend, interest, and repayment commitments over time.

Ideally, the information required should be expressed as a flow of funds in order to reflect these factors. In particular, it should also be measuring the one resource which indicates progress, survival and the ability to provide returns on investments – that is, cash. A business cannot survive, progress, repay loans and other debts, or pay dividends without cash. The ability of the enterprise to generate sufficient cash for these purposes appears to be of crucial interest to investors and others, and this has been hinted at already in the previous section dealing with information needs. Thus, the writer has argued on several occasions for a system of funds flow reporting based on cash.[53]

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[50] For a fuller explanation of the concept of relevance, see T. A. Lee, 'Utility and Relevance: the search for reliable accounting information', *Accounting and Business Research*, Summer 1971, pp. 242–249.

[51] The writer has developed his arguments for cash flow reporting on a number of occasions, and the following comments are derived mainly from 'Goodwill: An Example of Will-o'-the-Wisp Accounting', *Accounting and Business Research*, Autumn 1971, particularly pp. 325–328; 'The Relevance of Accounting Information Including Cash Flows', *The Accountant's Magazine*, January 1972, pp. 30–34; 'The Nature and Purpose of Cash Flow Accounting', *The Accountant's Magazine*, April 1972, pp. 198–200; and 'A Case for Cash Flow Reporting', *Journal of Business Finance*, Summer 1972, pp. 27–36. These ideas have also been discussed within differing contexts – for example, H. C. Edey, 'Accounting Principles and Business Reality, *Accountancy*, November 1963, pp. 998–1002, and December 1963, pp. 1083–1088; G. Lawson, 'Cash-flow Accounting', *The Accountant*, 28.10.71, pp. 386–389; and G. J. Staubus, 'The Relevance of Evidence of Cash Flows', in *Asset Valuation and Income Determination*, ed. R. R. Sterling, Scholars Book Co., 1971, pp. 42–69.

[52] See T. A. Lee, *The Funds Statement: a review and study of its nature and use in the United Kingdom*, research report for The Research and Publications Committee of The Institute of Chartered Accountants of Scotland, 1974.

Such a system would add a new dimension to financial reporting, showing sources and uses of cash over a period of time. The cash flows could be segregated to disclose those which evolve from trading operations, financial activities, long-term investment, and so on. The statements could be supported by other statements disclosing non-cash transactions, such as in acquisitions and mergers with other companies, which could have a significant bearing on the capacity of the enterprise to survive. They should also be subject to audit, in much the same way as for traditional financial statements, not only to verify their adequacy but also to remove any suspicion that company management may be manipulating the figures by delaying or accelerating cash movements. It is also recommended, for the above reason and because of the need to disclose a sufficient trend of figures, that several years' data be reported. It is also recommended, in order to minimise the criticism that past flows may not be repeated in the future, that forecast data should also be reported. It is felt that the relevance of this information to investors and others far outweighs its inevitable subjectiveness. The reporting of at least one year's forecast data should not present insuperable problems as it is information which management should have available in any case. The argument against forecasts of giving away vital information to competitors is a lame one because of the general nature of any externally reported information, and because there is no evidence existing to support it.

On the other hand, the arguments for a system of cash flow reporting are numerous, and appear significant enough to warrant a little more attention than they have been given hitherto.

(1) It is the generation and use of cash which enables the individual enterprise to survive; investment in companies, whatever its form, depends entirely on the capacity of companies to accumulate and apply cash in the most efficient and productive ways possible.

(2) Thus, although it may be argued that enterprise income is symbolic of company success and, therefore, of survival, it is no more than a symbol. Cash is the underlying economic success factor; income is not; and cash flow reporting therefore concentrates on the reality rather than the traditional symbol of enterprise success and survival.

(3) Cash is an economic factor which most persons in a developed society understand, through their day to day affairs. Income, on the other hand, is not, for it has developed far beyond the relatively simple surplus accounting generally associated with matching revenues and costs. Cash flow reporting, therefore, does not contain the considerable conceptual and practical measurement problems which beset income determination and asset valuation.

(4) The prediction of future dividends, loan repayments, creditor payments, and so on, *appear* to be far more strongly related to cash changes and situations than to periodic income. This further suggests a de-emphasising of income as the primary financial reporting concept.

(5) It is apparent from the literature[54] that there is a perceptive movement towards disclosure of forecast data, particularly that relating to enterprise income. Forecasting brings with it its own measurement problems,[55] and these are magnified considerably when future values and associated accruals require to be forecast in addition to the underlying economic activity. It is felt that forecast cash data at least minimises subjectivity by eliminating the requirement to forecast future accruals, etc.

(6) Cash flow reporting appears to satisfy the need to supply investors and others with stewardship-orientated information as well as with decision-orientated information. By eliminating the valuation problem from this type of financial report, management can report factually on its stewardship function, whilst at the same time disclosing data of use in the decision making process. In other words, cash flow reporting eliminates the somewhat artificial segregation of stewardship and decision making information, and emphasises properly that valuation is the concern of the investor and not of

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[53] See references in footnote [51].

[54] For example, J. G. Birnberg and N. Dopuch, 'A Conceptual Approach to the Framework for Disclosure', *The Journal of Accountancy*, February 1963, pp. 56–63; W. W. Cooper, N. Dopuch and T. Keller, 'Budgetary Disclosure and Other Suggestions for Improving Accounting Reports', *The Accounting Review*, October 1968, pp. 640–648; C. R. Tomkins, 'The Development of Relevant Published Accounting Reports, *Accountancy*, November 1969, pp. 815–820; and N. M. Bedford, *Extensions in Accounting Disclosure*, Prentice-Hall, 1973, especially p. 36.

[55] See C. Robinson, *Business Forecasting: an economic approach*, Nelson, 1971, especially pp. 163–178.

the reporting management.[56]

(7) Comparability, both inter- and intra-firm, is considerably enhanced by cash flow reporting; not only are data expressed in the same terms, free of the abuses of valuation and accrual accounting, but they can be compared with prior expectations if forecast data are also disclosed.

Conclusions

The primary intention of this essay has been to explore and analyse the complex nature of the enterprise income concept which has, and still does, dominate the present-day system of corporate financial reporting. The concept can be criticised on many grounds, sufficiently to cause the writer to believe that it does not deserve its present considerable position of importance. Nevertheless, it would be foolish to argue against it completely,[57] to do so would be to argue against the many years of constant and, presumably, successful use made of it by countless investors and others in the area of financial management. Indeed, simply because of the present tax structure, enterprise income cannot be neglected.

The defects attributable to enterprise income warrant consideration of other forms of financial report which appear more relevant to the needs of investors and others. In this respect, cash flow reports are worthy of a great deal of attention. The conclusion of the writer, therefore, is that there exist sufficient doubts about the relevance of income reporting to justify the serious comment made by Solomons that the concept may well be on the decline as other forms of financial reporting are recognised and adopted. It is the responsibility of the accountancy profession to ensure that the financial reports so recognised and adopted are the most relevant to the needs and requirements of those persons receiving and using them. Future developments in financial reporting must not be thought of solely in terms of the concept of enterprise income.

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[56] As suggested in the segregated system of funds accounting – R. A. Rayman, 'Is Conventional Accounting Obsolete?' *Accountancy*, June 1970, pp. 422–429; and by E. S. Hendriksen, *Accounting Theory*, Irwin, 1970 revised edition, pp. 136–137.

[57] As it has been suggested by Lawson, op. cit.

Cash Flow Valuation and Depreciation

Amir Barnea and Harold Bierman Jr.

For many years accounting theoreticians have argued the relevance of cash flows of an asset to determine its valuation and in computing its periodic depreciation.[1] This paper will attempt to refine somewhat the cash flow theory of depreciation by suggesting that the market values (replacement cost and resale value) as well as the present value of an asset are relevant information.[2]

Three alternative concepts of asset valuation will be considered:

R: Replacement cost (the cost of obtaining a factor of production that would offer the same capacity for production or service adjusted for any differences in maintenance costs or life).

V: The present value of the future services offered by the asset to a specific firm.[3]

S: The resale value of the asset.[4]

It will be argued that all three measures have relevance, but that it is useful to report separately the value in use by a specific firm (V) from the market measures of value (S and R). While the total change in value of an asset is a relevant measure, in some situations the change in market values of the asset (R and S) will be more readily computable. Also, in a very real sense two assets exist, a tangible and an intangible asset, and where feasible they should be accounted for separately. The method of calculation of V tends to insure the inclusion of intangible factors specific to the firm.

A firm may own an asset, say a car, and this car has a resale value of $2,000 (also assume the car that is currently owned may be replaced with essentially identical vehicles at a cost of $2,000; thus resale value is equal to replacement cost). Assume the present value in use of the car is $5,000 (there are intangibles of $3,000). The $2,000 measure of resale value and replacement cost is relevant information as is the $3,000 measure, and where possible both numbers should be presented. We will define the $3,000 to be 'goodwill' and label it G. G is specific to the firm using the asset.

One advantage of presenting the $2,000 market measure is that it tends to bypass the problem of joint costs and products. The jointness problem tends to make difficult the measure of the present value of a specific asset that is a component part of a complex production process.

Why should an effort be made to give the value of the goodwill rather than just the total present value? We want V broken down for several reasons. We can hypothesise that investors view G as being more risky than the resale value because the intangible component of value is more subject to the threat of competition than the tangible component. Also G is generally much more difficult to estimate than the resale value since it requires forecasts of the future (and in some cases we will not be able to estimate G or V). Assume a financial statement reports that the resale value of an asset is $10,000,000. Is the reader of the financial statement given useful information if he is also told the value of G for the firm? Would you pay anything to know G before you decided to buy the common stock of the firm? In situations where dissolution is not imminent or where the plant would not be replaced we might decide that neither the resale value nor the replacement cost are relevant. For example, in a gas pipeline company the salvage value or replacement cost of the gas pipeline is likely to be of much less informational value than the cash flows that will result from its use. However, if there is a probability of liquidating the asset, then its resale value is relevant information. If the asset will be replaced in the future, then its replacement cost is relevant to the determination of V.

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[1] For example see H. Bierman, Jr., 'Depreciable Assets – Timing of Expense Recognition', *The Accounting Review*, October 1961, pp. 613–618 and F. K. Wright, 'Towards a General Theory of Depreciation,' *Journal of Accounting Research*, Spring 1964, pp. 80–90. A. Kraus and R. J. Heufner in 'Cash Flow Patterns and the Choice of a Depreciation Method', in the *Bell Journal of Economics and Management Science*, Spring 1972, pp. 316–342 define the cash flow patterns implied by different depreciation methods.

[2] Amir Barnea, 'A Note on the Cash-Flow Approach to Valuation and Depreciation of Productive Assets', *Journal of Financial and Quantitative Analysis*, June 1972, pp. 1841-1846, concludes that cash flows and the depreciation of an asset are dependent but explicitly assumes that the cash flows are constant through time and implicitly assumes that if the cash flows are not constant the good-will associated with the asset will be depreciated.

[3] For a description of the difficulties associated with matching specific assets and their benefits see A. L. Thomas, *The Allocation Problem*, American Accounting Association Studies in Accounting Research, 3, 1969.

[4] R. J. Chambers, *Accounting, Evaluation and Economic Behaviour* (Prentice-Hall, New Jersey, 1966) states (p. 218) 'The current cash equivalents of the assets of a going concern are the sums obtainable in the short-run in the ordinary course of business; that is, market resale prices in the short-run.' Chambers, p. 92, discusses replacement cost and decides against its usefulness in asset accounting. Y. Goldschmidt, and S. Smidt, 'Valuing the firm's Durable Assets for Managerial Information', *Accounting Review*, April 1969, p. 328, recommend the use of current market values for internal decisions and controls.

Value Measures

There has been considerable difference of opinion as to whether 'cost' or 'value' should be used as the basis of recording an asset. But even if this issue were to be resolved there would still remain the questions of what is cost and what is value.

While we can define 'value' as the present value of cash flows offered by an asset, the application of present value theory to specific assets within the firm is difficult and sometimes impossible because of joint products, joint costs, and sloping demand curves. Also, the use of present values introduces a large degree of subjectivity into the measurement of specific assets.

In this paper we take the position that if values are used, at a minimum it is desirable to divide an asset into a tangible and an intangible component. The tangible component of an asset will have an initial basis equal to the cost of the asset. The intangible component may or may not be susceptible to measurement and will be equal to the difference between V and the value of the tangible component.

If we do not allow equality, the three values, R, S, and V, can be related in six different ways where the relative size of each is important. Three of the six cases can be readily eliminated since if $S > V$ the asset should be sold and we need not be concerned with the accounting problem. One more case can be eliminated since logically S cannot be greater than R; if $S > R$ there would be an incentive to continuously replace and sell the asset; thus it is necessary as an equilibrium condition that $R > S$. We are left with two possible situations that require accounting recommendations:

(a) $R > V > S$ (b) $V > R > S$.

Case (a) may exist but it is an unstable situation that, assuming no changes, will result in the firm liquidating the asset when it wears out. Where the situation does exist it would not be useful to use the replacement cost since the asset can either be sold (with S the value) or be used (with V the value), and the replacement costs which is larger than either S or V is not relevant and can be eliminated from consideration since the asset will not be replaced.

Case (b), where $V > R > S$, is the only one of the six situations where the use of replacement cost can logically be defended as a basis of recording the asset, and it is the most likely situation to be encountered.

Let us initially assume that R is equal to S, and define G to be the intangible value of the asset, where G is defined as:

$G = V - S$, or $V = S + G$.

If we identify the time period of V, S, and G with subscripts, then we have:

$V_{t-1} = G_{t-1} + S_{t-1}$

$V_t = G_t + S_t$

Defining $D_t = V_{t-1} - V_t$ and $d_t = S_{t-1} - S_t$, then $D_t = d_t = S_{t-1} - S_t$ if $G_{t-1} = G_t$.

That is, the change in value is defined in terms of the change in market value, and if the goodwill does not decrease in value D_t is defined by d_t, the change in the resale value. If G_{t-1} is not equal to G_t then

$D_t = (G_{t-1} - G_t) + (S_{t-1} - S_t)$

$= (G_{t-1} - G_t) + d_t$.

It could be argued that only $(S_{t-1} - S_t)$ is the depreciation of the asset; that $(G_{t-1} - G_t)$ is a change in value of the firm, and this change should not be considered to affect the depreciation of the asset. However, an investor would still want to know D_t as well as d_t since it is an important and useful measure.

Example

An investment costing $22,832 will return $10,000 a year for the next three years (this is a .15 yield). Assume the time value of money is .10. The resale value of the asset is currently $22,832 and at the end of the three periods resale value is estimated to be $17,000; $9,000; $0.

The depreciation schedule for the tangible asset and for goodwill would be as shown in the table below.

t	V_t	S_t	$G_t = V_t - S_t$	$D_t = (G_{t-1} - G_t) + (S_{t-1} - S_t)$	$(V_{t-1} - V_t)$
0	24,869	22,832	2,037	− 2,037	− 2,037
1	17,355	17,000	355	1,682 + 5,832 = 7,514	7,514
2	9,091	9,000	91	264 + 8,000 = 8,264	8,264
3	0	0	0	91 + 9,000 = 9,091	9,091
					22,832

In period 0 the purchase of an investment with a present value in excess of cost $2,037 gives rise to an increment in goodwill of $2,037. (The $2,037 is an unrealised gain.) The column where the first number is $5,832 gives the value of d_t.[5]

Replacement cost not equal to resale value

Up to this point we have assumed that R equals S. Now we will relax that assumption and consider the situation when $V > R > S$.

If we were to assume that the firm will continue to operate in the future with $V > S$, then S can be dropped from consideration. However, if there is some probability that the size of V relative to R and S will change so that $S > V$, then the measure of S will be important. If $S > V$ the firm should consider liquidating the asset. Since V is very much affected by the actions of the firm as well as by actions by competitors and the general level of business activity, we would expect V to be volatile. We know from observing the real world that there are situations where S is larger than V, assets are disposed of, thus the estimate of the resale value is a relevant measure for financial analysis.

Accounting Implications

Accounting practice is currently cost based with little attempt made to devise a depreciation expense computation procedure that is directly related to the economic characteristics of the specific asset being depreciated. We have argued that measures of present value, replacement cost, and resale value may all have relevance to a reader of a financial report.

A reliably measured resale value sets a floor in value and is likely to be more objective than the present value measure. However, resale value decreases in importance if the likelihood of sale is extremely low. The present value, if we eliminated the problems of jointly utilised assets, would be the most useful measure for appraising the value of a firm. But unfortunately jointness is a common characteristic and it is difficult to identify benefits earned by a firm with a specific asset. In addition, present value has the difficulty of frequently requiring highly subjective forecasts of the future. Replacement cost is not relevant to the accounting for a presently owned specific asset, but if we shift our focus to the firm by studying a 'chain of assets', then replacement cost does affect the change in value of the chain through time. Replacement cost projection does affect the accounting if the present value of all future cash flows is used.

Thus all three measures have their relevance and we cannot give exact decision rules dictating one method of accounting for all assets at all times. Unfortunately the conclusion is that the accounting depends on the information that is available as well as the information needed. If a firm owns an oil field, the resale value of the field is important as is the present value of the benefits assuming the firm does not sell. Presumably the replacement cost will affect these two measures, but the replacement cost estimate or the original cost does not directly affect the information that a decision maker will consider to be relevant for decisions. If the firm owned a major building the replacement cost is not as interesting to a prospective investor as the resale value and the present value of future revenues. However, if the firm owned a taxi franchise, and if the cars are replaced annually, the replacement cost projection would affect the present value of the taxi franchise to the firm.

Conclusions

In many situations the cash flows of specific assets will not be separable from the operating results of the firm. In such situations the choice of the depreciation method will depend on the reliability and availability of information. Lack of reliability has frequently been offered as the reason for reliance on cost, or amortised cost, which has the advantage in most cases of being more objective than replacement or resale value.

There is no question that as we move towards the use of value measures to replace or supplement cost, there is a necessity to indicate clearly the nature and the extent of the uncertainty associated with the measures.[6] But even if cost is used, depreciation methods have to be chosen.

This paper has recommended the use of present value (V) and the market values (S) and (R) in the valuation of assets and the measurement of depreciation. We have recommended a separation of asset measure and depreciation expense based on tangible and intangible characteristics. However, in some cases the determination of present value will be impossible because of jointness or some other complexity. In like manner there may be the very real problem of measuring replacement costs, or defining what is meant by replacement costs in a world of changing technology.

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[5] Closed form expressions for G can be derived that incorporate different growth (or decay) rate assumptions.

[6] See Y. Ijiri and R. Jaedicke, 'Reliability and Objectivity of Accounting Measurements', *The Accounting Review*, July 1966, pp. 474–483 and A.A.A. *A Statement of Basic Accounting Theory*, The American Accounting Association, 1966 for reinforcement of this point of view.

Inability to measure any of these items will tend to preclude their use, and will cause us to resort to historical cost as the basis of recording the asset. Strictly speaking the historical cost that has already been incurred is not relevant for any decision. However, where the other information is so unreliable that the decision maker has little or no faith in the information, then the decision maker may turn to cost or amortised cost in order to gain estimators of replacement cost, resale value and present value. If there is information that indicates that the value is greatly different than the cost (say technology has changed or economic conditions are not as forecasted) then this information should be used to adjust cost.

Marginal Costing and Linear Programming: Extension and Synthesis

Michael J. Barron

1 Introduction

Marginal costing covers a wide field and many cost accountants would, with good precedent, use the term in rather varied situations. It really applies whenever the distinction between fixed and variable cost is more important than any other distinction such as that between direct and indirect cost. Thus whole costing systems based on variable cost have been described as marginal costing and so has *ad hoc* decision making involving choice from a small number of alternatives. Yet neither has anything to do with linear programming. The first has nothing to do with programming at all and the second is strictly either integer or mixed integer programming; although usually best solved by just working out the profit under each alternative, comparing the results and choosing the most attractive.

A third use of the term, and the one relevant to this paper, is when the relationship between cost and output is being studied; for example when selecting correct production levels. Clearly in this application there is some similarity between the economist's and the cost accountant's use of the term even though in practice the resemblance may be rather slight. And it is also here that a close relationship exists between marginal costing and linear programming.[1]

Linear programming is, of course, no more than a mathematical technique for solving a particular kind of optimisation problem.[2] A linear objective function has to be maximised (or minimised) subject to linear inequality constraints. Thus the marginal costing 'product mix' problem is just a special case of linear programming. Appropriate levels of different products have to be chosen so that total contribution is maximised while bearing in mind that the solution must be feasible with the available resource capacity. However, instead of simply solving all product mix problems by linear programming a special, rather efficient, technique is usually advocated for problems with only one constraint. This is the well known rule of selecting the product with the maximum contribution per unit of limiting factor.

Surprisingly enough, in the literature, the status of this special rule is most unclear. Some authors regard it as a rather trivial case of simplex or perhaps as something that could in principle be generalised into simplex.[3] Others see it as something special and hence applicable only in very clearly defined circumstances; ordinary simplex being required in other cases.[4] A third group of writers appear to be quite oblivious of linear programming and, not surprisingly, fail to say anything very general.[5]

It is the purpose of this paper to clarify the relationship between the marginal costing 'contribution per unit of limiting factor' rule and the linear programming simplex method. In Section 2 the rule is explained and proved in its usual application. Section 3 shows that the addition of upper bound sales constraints in addition to one limiting factor can be handled easily with almost no modification of the rule. Section 4 extends the rule slightly so that it is applicable when any number of linear constraints are involved and Section 5 is a summary and conclusion.

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[1] There is also a very closely related literature on opportunity costing, some of which is concerned with the interpretation and application of the linear programming duals in the product mix problem. See Barron, M. J., 'The application of linear programming dual prices in management accounting – some cautionary observations', *Journal of Business Finance*, Vol. 4, 1, Spring 1972, pp. 51–69 and Samuels, J. M., 'Opportunity Costing: an application of mathematical programming', *Journal of Accounting Research*, Vol. 1, 2, Autumn 1963, pp. 182–191.

[2] While the discussion has been kept reasonably non-technical some elementary knowledge of linear programming is assumed. As far as possible the popular approach of Baumol, W. J., *Economic Theory and Operations Analysis* (3rd Edition), Prentice-Hall 1972, has been used.

[3] Samuels op. cit. appears to be one of the few in this category.

[4] Most costing text books, e.g. Horngren, C. T., *Cost Accounting: a managerial emphasis* (3rd Edition), Prentice-Hall 1972, take this view.

[5] The ICWA Report, *A Report on Marginal Costing*, Institute of Cost and Works Accountants, Gee and Co. 1961, is perhaps the most disturbing example.

2 The classical example

The literature of marginal costing, like the literature of most other areas of management accounting, has demonstrated an overwhelming concern for the situation where decisions can be made subject to respecting just one constraint. The roles of 'the limiting factor' in marginal costing and of 'the key budget factor' in budgetary control both illustrate this point. And although these techniques have suffered severe criticism for their naivety they continue to be respected by the practical men of the profession. Thus it is fitting, as well as being a useful first step, to re-examine single constraint marginal costing, to compare it with linear programming and to generalise and make rigorous the traditional rule about maximising contribution per unit of limiting factor.

In its classical form the problem requires the selection of one or more products from n potential products such that a contribution function F(x) is maximised to a single constraint. If c_i is the unit contribution of product i, x_i its level of production, a_i the amount of the limiting factor (total capacity d_1) and if the problem is linear it may be written.

$$\begin{aligned} &\text{Max } F(x) = c_1x_1 + c_2x_2 + \dots + c_nx_n \\ &\text{Subject to} \quad a_1x_1 + a_2x_2 + \dots + a_nx_n \leqslant d_1 \quad (1) \\ &\qquad x_i \geq 0 \quad i = 1, 2, \dots, n \end{aligned}$$

Alternatively the inequality may be removed by the addition of a slack variable s_1 so that (1) becomes:

$$\begin{aligned} &\text{Max } F(x) = \quad c_1x_1 + c_2x_2 + \dots + c_nx_n \\ &\text{Subject to } s_1 = d_1 - a_1x_1 - a_2x_2 - \dots - a_nx_n \quad (2) \\ &\qquad s_1 \geqslant 0 \quad x_i \geqslant 0 \quad i = 1, 2, \dots, n. \end{aligned}$$

The marginal costing rule recommends that production should be concentrated in that product with the 'highest contribution per unit of limiting factor'. That is in the product for which the ratio c_i/a_i is greatest. This rule is usually explained by means of a very simple example rather than, in any sense, being proved. However, the principle is that one unit of constraint devoted to product i produces $1/a_i$ units of that product which in turn generates a contribution of c_i/a_i. There is no reason, with this model, not to concentrate on the single product for which c_i/a_i is greatest and hence to get the most total contribution out of the limited capacity.

An alternative and more rigorous approach to the same problem shows that apart from certain small provisos the rule is correct. Moreover, it provides some interesting and useful insights into the single constraint model and paves the way for subsequent more sophisticated models.

The linear programming problem defined by (1) and (2), if it has a solution at all, will have a basic solution with one of the variables taking a positive value and all the rest taking zero values.[6] As an example the basic solution $s_1 = d_1$, $x_r = 0$, $(i = 1, 2, \dots, n)$, $F(x) = 0$ is given by merely inspecting (2) but this will not be optimal if any $c_i > 0$. Thus typically (2) will have to be rearranged (pivoted) so that a basic solution with $x_r > 0$ and $s_i = 0$ can be easily examined. In practice r is usually chosen such that c_r is the greatest of the positive unit contributions but the only important point for the time being is that $c_r > 0$.

After rearrangement (2) becomes

$$\text{Max } F(x) = \frac{c_rd_1}{a_r} + \sum_{\substack{i=1 \\ i\neq r}}^{n} (c_i - \frac{c_ra_i}{a_r})\, x_i - \frac{c_r}{a_r}\, s_1 \qquad (3)$$

$$\text{Subject to } x_r = \frac{d_1}{a_r} - \sum_{\substack{i=1 \\ i\neq 1}}^{n} \frac{a_i}{a_r}\, x_i - \frac{1}{a_r}\, s_1$$

This readily gives the basic solution $x_r = d_1/a_r$, $x_i = 0$ $(i \neq r)$, $s_1 = 0$, $F(x) = c_rd_1/a_r$. It is feasible so long as $d_1/a_r \geq 0$ and optimal if all the coefficients in the rearranged objective function are negative.[7]

In most practical situations as well as in text book examples it is assumed that $d_1 > 0$, $a_i > 0$ and $c_i > 0$ $(i = 1, 2, \dots, n)$ in which case the feasibility criterion $d_1/a_r \geqslant 0$ is automatically satisfied no matter which product is chosen. Optimality, however, further requires that $(c_i - \frac{c_r\, a_i}{a_r}) \leqslant 0$ $(i \neq r)$.[8] Since $a_i > 0$ this condition is equivalent to requiring $c_i/a_i \leqslant c_r/a_r$. In other words optimality is guaranteed by selecting r so that the contribution per unit of limiting factor (c_r/a_r) for r is greater than or equal to that for any other product. Thus under the assumption of positive coefficients and unit contributions the marginal costing rule is quite correct.

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[6] The basic theorem of linear programming, Hadley, G., *Linear Programming*, Addison-Wesley 1962, pp. 80–84.

[7] See Hadley, op. cit., pp. 95–99.

[8] Note that the coefficient of s will automatically be negative since $c_r/a_r > 0$.

At first sight it seems perfectly acceptable to assume that $c_i > 0$ and $a_i > 0$ but this rules out the possibility of attractive products, perhaps more correctly called activities, that cost money but provide resources. Accordingly it is much more satisfactory to allow the c_i and a_i to be unrestricted in sign. They need not be totally unrestricted because a few possibilities can be ruled out very quickly. No activity need be considered if it has $c_i < 0$ and $a_i \geqslant 0$ because, costing money and using resources, it would never be selected. In contrast an activity with $c_i > 0$ but $a_i \leqslant 0$ generates both contribution and scarce resource. This allows an unbounded solution with infinite profit which presumably could only arise from a mistake in the model formulation. In any case it need not be regarded as a practical possibility in the real world. When taken together these two situations rule out all possibility that the contribution per unit of limiting factor (c_i/a_i) for any activity can be non-positive or to put it the other way round they ensure that all $c_i/a_i > 0$.

In addition to the above, rather obvious, restriction it is possible to go further and prove that if any activities have a negative unit contribution then unless the smallest c_i/a_i of such activities is greater than or equal to the greatest c_i/a_i of the remaining activities (which have positive unit contributions) the solution will be unbounded.

There are several ways of proving this theorem. The most interesting from the point of view of understanding why it works is to take two activities, r and k, such that $c_r > 0$ but $c_k < 0$ and examine the conditions under which it is possible to combine these activities to give an infinite profit. That is using one activity to supply extra resource and the other to use it in generating contribution.

A more elegant proof observes that (3) will have an unbounded solution if both the following conditions are met.[9]

$$c_k - \frac{c_r a_k}{a_r} > 0 \tag{4a}$$

$$-\frac{a_k}{a_r} > 0 \tag{4b}$$

Since by assumption $c_r > 0$ and consequently $a_r > 0$ it follows from (4b) that $a_k < 0$. If $a_k < 0$ then (4a) can be rewritten as

$$\left(\frac{c_k}{a_k} - \frac{c_r}{a_r}\right) < 0 \quad \text{or} \quad \frac{c_k}{a_k} < \frac{c_r}{a_r} \tag{5}$$

Thus if r and k can be chosen so that $c_r > 0$, $c_k < 0$ and (5) is satisfied the solution is unbounded.

The limiting factor rule can now be generalised by saying that in a correctly formulated linear single constraint problem any activities with negative unit contribution ($c_i < 0$) may be ignored completely and from the remainder the one offering the greatest contribution per unit of limiting factor should be chosen.[10] Fortunately the proof of this rule is very simple and requires little more than an inspection of (3).

It has already been shown that a feasible solution requires $a_r > 0$ and hence $c_r > 0$. Thus the selected activity must of necessity be chosen from those with a positive unit contribution and, of course, of those it must be the one with the greatest contribution per unit of limiting factor.

The real problem is with the activities which have $c_i < 0$ and $a_i < 0$. If $a_i < 0$ the optimality condition $(c_i - \frac{c_r a_i}{a_r}) \leqslant 0$ simplifies to $\frac{c_i}{a_i} \geqslant \frac{c_r}{a_r}$ and hence for the marginal costing rule to be correct this condition must automatically be satisfied for all these activities. Fortunately if the model is correctly formulated this must be true since the alternative is $\frac{c_i}{a_i} < \frac{c_r}{a_r}$ which with $c_i < 0$ and $c_r > 0$ implies, from the theorem above, an impossible unbounded solution.

3 Sales constraints and the cascade principle

Once a problem has more than one constraint it is believed, quite widely, that marginal costing cannot cope. However, this is not really true and certainly additional upper bound sales constraints can be handled extremely easily.

The simplest case of all is when the only constraints are upper bounds; that is:

$$\text{Max } F(x) = c_1x_1 + c_2x_2 + \ldots + c_nx_n \tag{6}$$

$$\text{Subject to} \quad 0 \leqslant x_i \leqslant u_i \quad u_i = 1, 2, \ldots, n.$$

In this situation it is very simple to show that the intuitively obvious solution is correct. That is, all products which have positive unit contributions should be produced to capacity and no other products should be produced at all. The proof of this rule requires no more than the addition of n slack variables to the inequalities of (6) and the appropriate re-arrangement of the resulting equations to conform with the basic solution given by the rule. It will be immediately observed that this solution is both feasible and optimal.

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[9] See Hadley, op. cit., 93–95.

[10] It is assumed throughout for ease of exposition that $c_i/a_i \neq c_j/a_j$, $i \neq j$. The relaxation of this assumption allows alternative optimal solutions to exist but otherwise makes no material difference to the analysis.

A rather more interesting case is when, in addition to the n upper bound constraints, a single 'limiting factor' constraint, call it a production constraint, is relevant to all products. This is illustrated by (7).

$$\begin{aligned} &\text{Max } F(x) && c_1x_1 + c_2x_2 + \ldots + c_nx_n \\ &\text{Subject to } s_1 = d_1 - a_1x_1 - a_2x_2 - \ldots - a_nx_n && (7) \\ &0 \leqslant x_i \leqslant u_i\,(i = 1, 2, \ldots, n), s_1 \geqslant 0. \end{aligned}$$

Oddly enough the marginal costing rule that would apply to (7) or indeed the very simple rule for (6) does not seem to be given in the literature of the subject. Nevertheless, private discussion has revealed that a consensus certainly exists as to what they should be. The rule applicable to (7) says that products should be chosen in the descending order of their contribution per unit of limiting factor (c_i/a_i). The one with the greatest c_i/a_i is produced to its upper bound if possible and then the next highest is produced to its upper bound and so on until the supply of limiting factor is exhausted. I have dubbed this the 'single cascade principle' and, as will be demonstrated, although it is slightly over simple in general, it is correct for the important case of $c_i > 0$ and $a_i > 0$, $(i = 1, 2, \ldots, n)$.

An analysis of (7) is most easily undertaken by means of the special linear programming algorithm for use with upper bounded problems.[11] In effect this ignores the upper bounds as constraints to be considered in the basis but instead allows the variables that one would normally think of as non-basic to take their upper bound values as an alternative to zero. This makes the calculation of the value of the basic variables and of the objective function more awkward but the benefits from handling the reduced basis provide more than sufficient compensation. A further small annoyance is that the optimality and pivot rules are slightly unusual. In particular a 'non-basic' variable at its upper bound could feasibly be reduced but not raised; thus for these variables the usual optimality rules have their signs reversed. There are also some modifications to the pivot rules but as these are intricate rather than important they can be explained as they arise.

Before applying this technique to generalising the cascade principle it is helpful to demonstrate the benefits of the upper bound algorithm approach by examining the solution to (7) when $c_i > 0$, $a_i > 0$, $(i = 1, 2, \ldots, n)$. In this situation the single cascade process ends when any further increase of activity r is terminated not by reaching $x_r = u_r$ but by running out of limiting factor capacity. Thus all products with $c_i/a_i > c_r/a_r$ will have been produced to their capacity and for convenience the set of such products can be denoted U.[12] This solution is given by rearranging (7) to form (8) and noting that all non-basic variables are either at 0 or at their upper bounds.

$$\begin{aligned} \text{Max } F(x) &= \frac{c_rd_1}{a_r} + \sum_{\substack{i=1\\ i\neq r}}^{n} (c_i - \frac{c_ra_i}{a_r})\,x_i - \frac{c_r}{a_r}\,s_1 = \\ &\quad \frac{c_rd_1}{a_r} + \sum_{i \epsilon U} (c_i + \frac{c_ra_i}{a_r})\,u_i \\ \text{Subject to } x_1 &= \frac{d_1}{a_r} - \sum_{\substack{i=1\\ i\neq r}}^{n} \frac{a_i}{a_r}\,x_i - \frac{1}{a_r}\,s_1 = \\ &\quad \frac{d_1}{a_r} - \sum_{i \epsilon U} \frac{a_i}{a_r}\,u_i \end{aligned} \tag{8}$$

The feasibility of this solution is assured because the activities are either at their upper bounds, at zero or, in one case, between the two. The limiting factor constraint is either exactly satisfied or else, if there are insufficient activities, it may be left with slack but it cannot be violated.

The optimality conditions are more involved because the usual rule $(c_i - \frac{c_ra_i}{a_r}) \leqslant 0$ only applies to activities not at their upper bounds (i.e. $i \notin U$). The rule for activities at their upper bounds, as explained above, must have the inequality sign reversed which alters the rule to $(c_i - \frac{c_ra_i}{a_r}) \geqslant 0$. All activities have $a_i > 0$ so the two rules simplify to $c_i/a_i \leqslant c_r/a_r$ for $i \notin U$ and $c_i/a_i \geqslant c_r/a_r$ for $i \varepsilon U$. Since activity r is the last to be selected the conditions are certain to be satisfied. This is because any activity previously chosen will be at its upper bound (i.e. $i \varepsilon U$) and will also have a contribution per unit of limiting factor greater than that for activity r. In contrast any activity not yet chosen (i.e. $i \notin U$) will have $c_i/a_i \leqslant c_r/a_r$. Thus both conditions are satisfied.

In order to generalise the cascade principle so that c_i and a_i can be unrestricted in sign it is important to realise that any activity for which $a_i < 0$ supplies limiting factor rather than uses it. Consequently the existence of such activities means that the supply of limiting factor is not absolutely fixed but, at a price, can be increased. This leads naturally te dividing the activities into two groups; group A for which $a_i > 0$ (but including activities for which $a_i = 0$ with $c_i > 0$) and group B for which $a_i < 0$ (but including $a_i = 0$ with $c_i < 0$). Group A can bo thought of as the factor using activities which obviously are more attractive the higher their ratio of c_i/a_i since a high c_i/a_i means a lot of contribution in relation to the amount of limiting factor that they use up. On the other hand group B, the factor supplying activities, are more attractive the lower their c_i/a_i since, in effect, the lower c_i/a_i the more cheaply extra factor may be acquired.

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[11] See Hadley, op. cit., pp. 387–395 or Gass, S. I., *Linear Programming* (3rd Edition), McGraw-Hill 1969, pp. 196–201.

[12] It is of course possible that the first activity exhausts the capacity in which case U will be empty.

The detail of how group A and group B activities are balanced against each other under the rules of the generalised (or double) cascade are shown in the flow chart of Fig. 1. However, in case this appears rather involved it may be helpful to explain the process, albeit not too rigorously, in words.

First of all any group B activities with $c_i > 0$ are raised to their upper bounds because they provide limiting factor as well as contribution. Next the existing limiting factor capacity is used up by group A products precisely as in the single cascade rule; that is one at a time, to their upper bounds and in descending order of their c_i/a_i's. When the capacity is used up the last group A activity to be accepted is typically below its upper bound so the cheapest unused group B activity is examined. With luck it may be a sufficiently cheap source of factor to supply the extra capacity necessary to push the last group A activity to its upper bound and yet leave some contribution. Sometimes, of course, the group B activity is unable, because of its own upper bound, to supply enough factor and the next cheapest source has to be examined as well. On other occasions the group B activity is left below its upper bound and it is worth going back to group A to see if this potential capacity could be used up profitably. Thus the process continues, hand over hand so to speak, until there are either no more sufficiently cheap sources of factor or else no more sufficiently profitable uses for the factor.

It is easy enough to show that this process produces an optimal solution once it is recognised that it will always terminate with all activities bar one at either their upper bounds or at zero. That is one activity, which may be from either group, may be left below its upper bound but because of the step by step nature of the algorithm it will never be more than one. Consequently, the solution may always be analysed by the single rearrangement of the problem given in (8).

Feasibility is guaranteed by the nature of the process and need not be considered in detail again. However, optimality is complicated even further because although the basic conditions, $(c_i - \frac{c_r a_i}{a_r}) \leqslant 0$, $i \notin U$ and $(c_i - \frac{c_r a_i}{a_r}) \geqslant 0$, $(i \varepsilon U)$, are the same as before when these are put in terms of contribution per unit of limiting factor it is necessary to distinguish between group A and group B activities. The reason is simply that group A have $a_i > 0$ whereas group B have $a_i < 0$ so that if the solution is to be optimal the different activities must satisfy different rules.[13] To be specific:

(i) group A activities at their upper bound must satisfy $\frac{c_i}{a_i} \geqslant \frac{c_r}{a_r}$

(ii) group A activities not at their upper bound must satisfy $\frac{c_i}{a_i} \leqslant \frac{c_r}{a_r}$

(iii) group B activities at their upper bound must satisfy $\frac{c_i}{a_i} \leqslant \frac{c_r}{a_r}$

(iv) group B activities not at their upper bound must satisfy $\frac{c_i}{a_i} \geqslant \frac{c_r}{a_r}$

A moment's reflection and a glance at Fig. 1 will be enough to show that these conditions are all automatically satisfied by the final solution to the double cascade algorithm.

At first sight the detail of Fig. 1 and even the explanation may seem sufficiently complicated for the double cascade to compare unfavourably with existing linear programming codes that could solve the same problem. However, there is an alternative graphical way of looking at the solution which makes the practical implementation fairly trivial.

The graph in Fig. 2 illustrates this approach. It shows the relation between contribution per unit of limiting factor and aggregate limiting factor used (by group A activities) or supplied (by group B activities). The initial tread of the rising staircase is existing capacity and each subsequent tread is the increase available by accepting the next cheapest factor supplying activity. The descending staircase is interpreted similarly except, of course, that activities use factor instead of supplying it and are chosen in

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[13] Interested readers may easily confirm that the same rules apply to the rare case of $a_i = 0$.

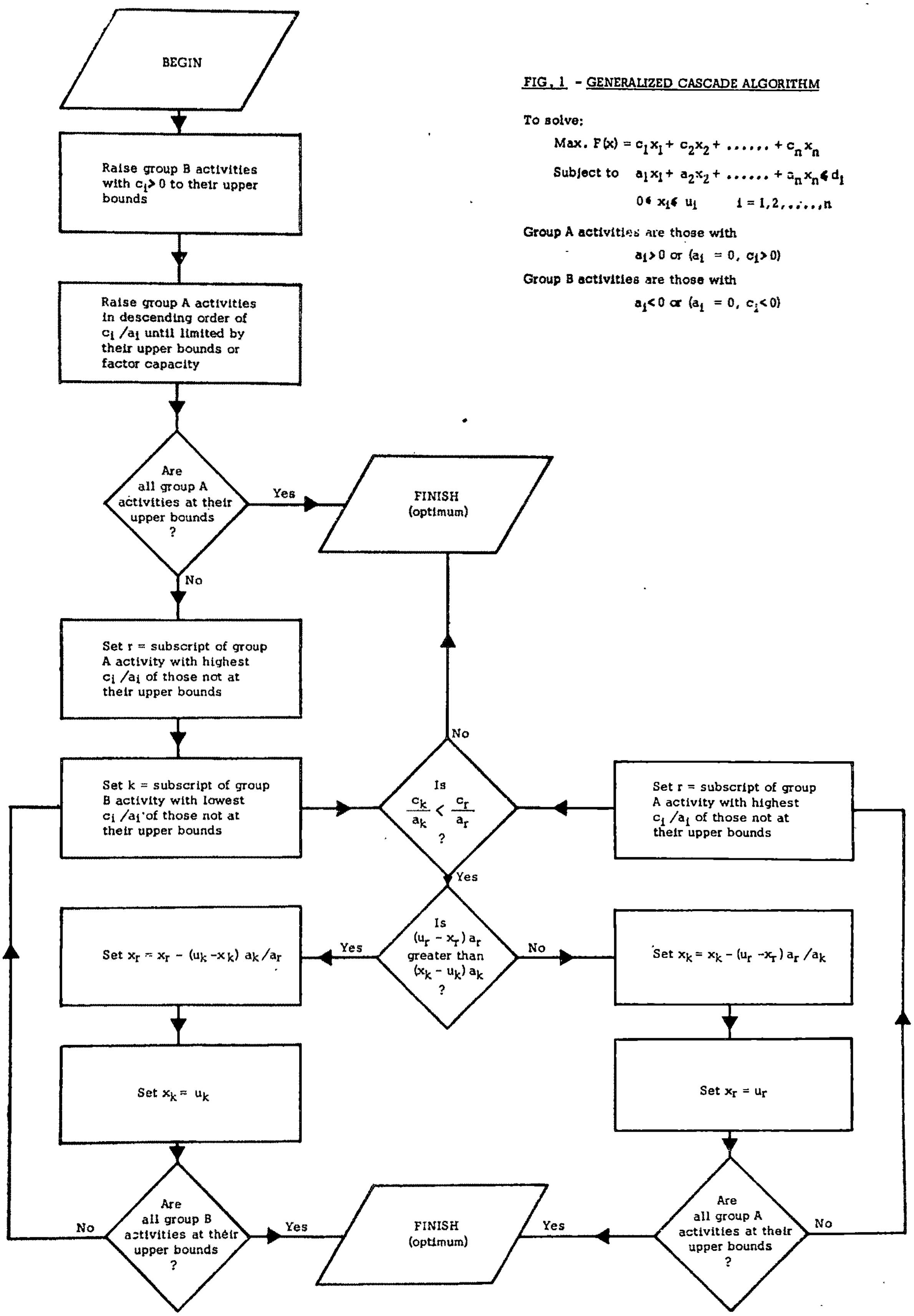

BEGIN
Raise group B activities with $c_i > 0$ to their upper bounds
Raise group A activities in descending order of c_i/a_i until limited by their upper bounds or factor capacity
Are all group A activities at their upper bounds ?
Yes
FINISH (optimum)
No
Set r = subscript of group A activity with highest c_i/a_i of those not at their upper bounds
Set k = subscript of group B activity with lowest c_i/a_i of those not at their upper bounds
Is $\frac{c_k}{a_k} < \frac{c_r}{a_r}$?
No
Yes
Set r = subscript of group A activity with highest c_i/a_i of those not at their upper bounds
Is $(u_r - x_r)\,a_r$ greater than $(x_k - u_k)\,a_k$?
Yes
No
Set $x_r = x_r - (u_k - x_k)\,a_k/a_r$
Set $x_k = x_k - (u_r - x_r)\,a_r/a_k$
Set $x_k = u_k$
Set $x_r = u_r$
Are all group B activities at their upper bounds ?
No
Yes
FINISH (optimum)
Yes
Are all group A activities at their upper bounds ?
No

FIG. 1 - GENERALIZED CASCADE ALGORITHM

To solve:

Max. $F(x) = c_1x_1 + c_2x_2 + \dots\dots + c_nx_n$

Subject to $a_1x_1 + a_2x_2 + \dots\dots + a_nx_n \leq d_i$

$0 \leq x_i \leq u_i \qquad i = 1, 2, \dots, n$

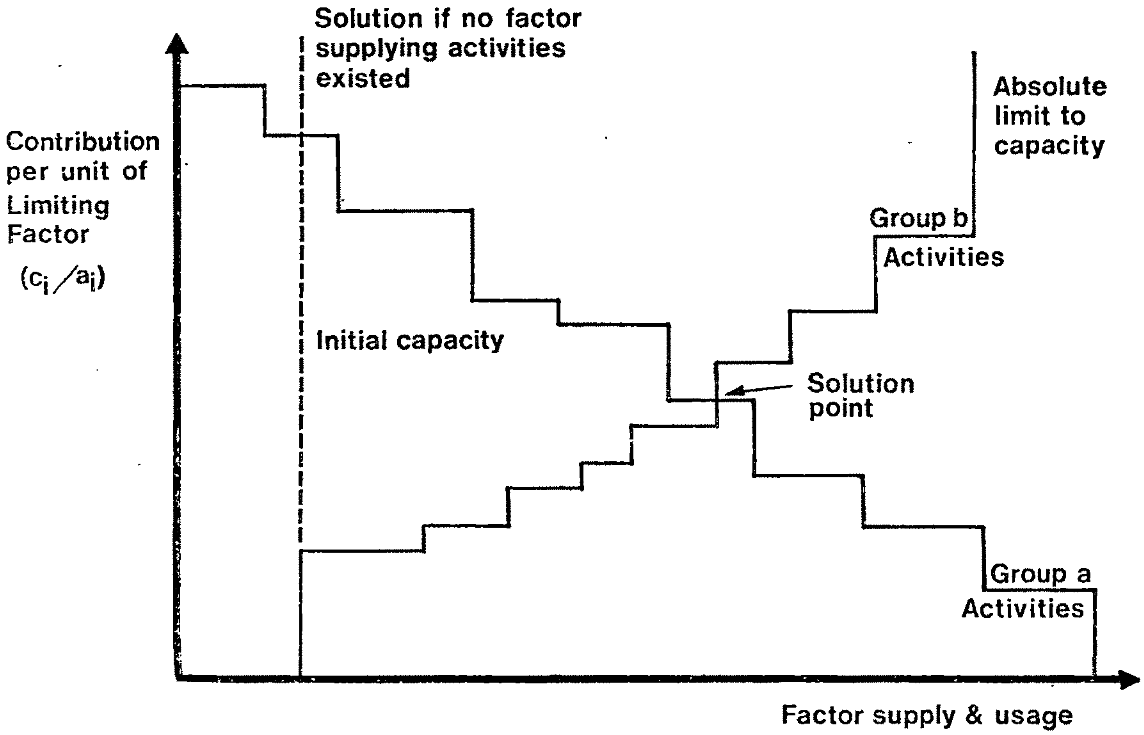
Group A activities are those with

$a_i > 0$ or $(a_i = 0,\ c_i > 0)$

Group B activities are those with

$a_i < 0$ or $(a_i = 0,\ c_i < 0)$

FIG. 2



descending order of c_i/a_i instead of ascending order.

The optimal range of activities is determined from the crossing point of the two lines. Before this point additional capacity can be used to generate contribution but beyond it additional factor costs more than the extra contribution it produces. Consequently the determination of an optimal solution in practice requires no more than noting which activities are to the right and which to the left of the crossing point and calculating the exact level required of the 'intersected' activity.

Before moving to the next section it is worth sparing a moment to consider the ease with which Fig. 2 fits into the very familiar economist's marginal analysis. The business has to be regarded as dealing in the limiting factor rather than the individual activities but once that is accepted the rising line is marginal cost, the falling line marginal revenue and the area between the two curves total contribution.

4 The generalisation to allow many constraints

The traditional 'contribution per unit of limiting factor' rule was never really intended to work for more than one limiting factor so, not surprisingly, it needs some modifications to make it general. For example, when dealing with just one constraint the limiting factor must be that single constraint; hence, finding the contribution per unit of limiting factor requires only rather trivial arithmetic. In contrast when many constraints are involved it is necessary to establish not only which factor is limiting but even whether the concept of a limiting factor is any longer meaningful.

There are, of course, plenty of other differences between single constraint and many constraint problems but fortunately most of them, including the one above, turn out to be more apparent than real. In other words, the generalisation does not so much require new principles as a careful interpretation of the old ones. This may seem surprising at first but is easily demonstrated by means of a simple example.

Consider a product-mix problem with a linear contribution function and three linear constraints:

$$\begin{aligned} \text{Max } F(x) &= x_1 + 2x_2 + 1\tfrac{1}{2}x_3 \\ \text{Subject to } \quad & x_1 + x_2 + \tfrac{1}{2}x_3 \leqslant 4 \\ & 3x_1 + x_2 + 2x_3 \leqslant 10 \\ & x_1 + 4x_2 + 2x_3 \leqslant 12 \\ & x_1, x_2, x_3 \geqslant 0 \end{aligned} \tag{9}$$

This may be written more conveniently in the form of equations with slack variables as (10).

$$\begin{aligned} \text{Max } F(x) &= x_1 + 2x_2 + 1\tfrac{1}{2}x_3 \\ \text{Subject to } s_1 &= 4 - x_1 - x_2 - \tfrac{1}{2}x_3 \\ s_2 &= 10 - 3x_1 - x_2 - 2x_3 \\ s_3 &= 12 - x_1 - 4x_2 - 2x_3 \end{aligned} \tag{10}$$

An obvious feasible solution to (10) is $x_1 = 0$, $x_2 = 0$, $x_3 = 0$, $s_1 = 4$, $s_2 = 10$ and $s_3 = 12$ with $F(x) = 0$. The zero level for total contribution is, of course, too low but could easily be raised by increasing any of the x_i; for example if $x_1 = 1$, $F(x) = 1$, if $x_1 = 2$, $F(x) = 2$ and so forth. However, x_1 cannot be increased indefinitely and despite the supposed complication of having three constraints it does, very definitely, have a unique limiting factor; it is, in fact, constraint 2. When x_1 reaches $3\frac{1}{3}$ all the constraint 2 capacity is used up, s_2 falls to zero and any further increase of x_1 is impossible. The other two constraints still have spare capacity but that in no way helps x_1 to increase beyond $3\frac{1}{3}$.

It does not follow that because constraint 2 is limiting for x_1 it is necessarily also limiting for x_2 or x_3. It may be or it may not be, and in fact x_2 is limited by constraint 3 because s_3 reaches zero as soon as x_2 reaches 3. In contrast s_1 only falls to zero when x_2 reaches 4 and s_2 not until x_1 reaches 10. The third activity is limited in a similar manner by constraint 2.

Merely establishing that the idea of a limiting factor is perfectly meaningful with more than one constraint and discovering which constraint binds which activity is not, of itself, enough. It is necessary to decide which of the three activities should be raised. In view of the traditional rule the obvious contender is the one with the greatest contribution per unit of its limiting factor. Product 1 has a unit contribution of 1 and one unit of its limiting factor (constraint 2) is needed to make one third of a unit of product 1, hence its contribution per unit of its limiting factor is $1 \times \frac{1}{3} = \frac{1}{3}$. Similar calculations for products 2 and 3 show their contribution per unit of their limiting factors to be $\frac{1}{2}$ and $\frac{3}{4}$ respectively. Of the three figures the one for product 3 is greatest and accordingly product 3 is chosen. It is, as explained above, limited in its increase to $x_3 = 5$ by constraint 2 since s_2 falls to zero before s_1 or s_3. Thus the new solution will have $x_1 = 0$, $x_2 = 0$ and $s_2 = 0$, and hence is most easily analysed by rearranging (10) to form (11).

$$\begin{aligned} \text{Max } F(x) &= 7\tfrac{1}{2} - 1\tfrac{1}{4}x_1 + 1\tfrac{1}{4}x_2 - \tfrac{3}{4}s_2 \\ \text{Subject to } s_1 &= 1\tfrac{1}{2} - \tfrac{1}{4}x_1 - \tfrac{3}{4}x_2 + \tfrac{1}{4}s_2 \\ x_3 &= 5 - 1\tfrac{1}{2}x_1 - \tfrac{1}{2}x_2 - \tfrac{1}{2}s_2 \\ s_3 &= 2 + 2x_1 - 3x_2 + s_2 \end{aligned} \qquad (11)$$

As x_1, x_2 and s_2 are all zero the solution for the other variables is given simply as the constant in each equation. Total contribution has increased so that $F(x) = 7\frac{1}{2}$ and $x_3 = 5$ but there is still slack in constraints 2 and 3, to be specific $s_1 = 1\frac{1}{2}$ and $s_3 = 2$. Thus although the solution is much improved it could perhaps be increased still further.

Both x_1 and x_2 are still at zero but unfortunately both use constraint 2 capacity so if either of them was increased x_3 would have to be decreased. This may or may not be worthwhile depending on the relative profitability of the relevant activities. In fact (10) shows that to make one unit of product 1 requires three units of constraint 2 capacity but finding those three units requires one and a half units of product 3 to be sacrificed. Since a unit of product 1 only brings in a contribution of 1, whereas losing $1\frac{1}{2}$ units of product 3 costs $2\frac{1}{4}$, there is a net loss of $1\frac{1}{4}$ and obviously the exchange is not worthwhile. On the other hand, a unit of product 2 needs just one unit of constraint 2 capacity which requires the sacrifice of only half a unit of product 3. This time the exchange is worthwhile since for every unit of product 2 the gain is $(1 \times 2 - \frac{1}{2} \times 1\frac{1}{2} = 1\frac{1}{4})$. The figure of $1\frac{1}{4}$ net contribution for every unit increase is, of course, given in the objective function of (11) as the coefficient of x_2 as indeed is the $-1\frac{1}{4}$ associated with x_1 and also the $-\frac{3}{4}$ which would be the net loss for every unit if s_2 was increased.

Evidently it is not worth increasing x_1 or s_2 but it is worth increasing x_2. And in general increasing any activity with a positive coefficient in the objective function increases total contribution. If there were several activities with positive coefficients the one with the greatest contribution per unit of its limiting factor could be chosen. However, in the example x_2 has no competition and it can be increased until s_3, its limiting capacity, falls to zero. As it happens this occurs when x_2 reaches $\frac{2}{3}$.

A solution with $x_1 = 0$, $s_2 = 0$ and $s_3 = 0$ is analysed in the usual way by rearranging (11) to form (12).

$$\begin{aligned} \text{Max } F(x) &= 8\tfrac{1}{3} - \tfrac{5}{12}x_1 - \tfrac{5}{12}s_3 - \tfrac{1}{3}s_2 \\ \text{Subject to } s_1 &= 1 - \tfrac{3}{4}x_1 + \tfrac{1}{4}s_3 + 0s_2 \\ x_3 &= 4\tfrac{2}{3} - 1\tfrac{5}{6}x_1 + \tfrac{1}{6}s_3 - \tfrac{2}{3}s_2 \\ x_2 &= \tfrac{2}{3} + \tfrac{2}{3}x_1 - \tfrac{1}{3}s_3 + \tfrac{1}{3}s_2 \end{aligned} \qquad (12)$$

This time constraints 2 and 3 are used to capacity, $x_2 = \frac{2}{3}$, $x_3 = 4\frac{2}{3}$, $s_1 = 1$ and although $x_1 = 0$ it is not worth increasing since its objective function coefficient is negative $(-\frac{5}{12})$. Thus total contribution would fall if x_1 were increased and since the same is true for s_2 and s_3 it is reasonable to tentatively assume that this solution is optimal. That is $x_1 = 0$, $x_2 = \frac{2}{3}$ and $x_3 = 4\frac{2}{3}$ is the most profitable product mix and the resulting total contribution of $8\frac{1}{3}$ the greatest possible for this problem.

Two closely related questions are raised by this example. Firstly, is it possible to generalise and make rigorous the method illustrated and secondly, is it really just linear programming simplex by another name? Since the answer to the second question leads on to the answer to the first it is best to take them in reverse order.

Certainly it is true that if the contribution per unit of limiting factor rule is extended as illustrated in the example it has a lot in common with linear programming. For example, only basic solutions are considered; the solution process is iterative; at each iteration only one variable is introduced into the basis and correspondingly only one is removed; the familiar pivot process is used at each iteration; the optimum is recognised by the sign of the objective function coefficient. There are other similarities as well and certainly the method of exposition was chosen to highlight them. However, there are also differences and perhaps the most important of these is that the example was solved in two pivots, whereas a conventional simplex solution would take four; that is twice as many.

Needless to say, the example was selected because it showed such an impressive improvement over conventional simplex. This need not always be the case, but it does confirm that the two methods are different, although a moment's thought shows that the only real difference is in their pivot rules. In fact, to be specific, only the rule to determine which variable should enter the basis is different because once that variable has been chosen the one destined to leave is automatically determined. It is simply whichever variable first falls to zero.

In conventional simplex the variable with the greatest positive coefficient in the objective function is made basic, whereas in the marginal costing rule, of those with positive coefficients, the one with the greatest contribution per unit of its limiting factor is chosen. Typically, this will lead to a different variable entering the basis at each stage and, therefore, usually also a different one leaving. Consequently, while either method will eventually reach the correct solution they may well follow quite different paths.

It is well known that the usual simplex rule does not guarantee that each pivot step gives the greatest possible increase in contribution. After all, it is perfectly likely that the activity with the greatest objective function coefficient will have its increase constrained early while some other activity, with a lower coefficient, is able to increase a great deal and hence generate more contribution in total. Indeed, one might almost regard conventional simplex as always backing the hare and forgetting the tortoise!

The practicable simplicity of the simplex rule more than justifies its apparent arbitrariness. This is because although it may not take the path with the fewest number of pivots, it does carry out each pivot extremely quickly. Nevertheless, it is perfectly possible to modify the method so that F(x) does increase as much as possible at each step. This technique is known, for obvious reasons, as the method of steepest ascent and it is in almost all respects the same as the marginal costing rule. However, there is one crucial difference which is most easily explained by looking back at the example.

When equation (10) was pivoted the increase in profit of $7\frac{1}{2}$ arose because constraint 2 allowed $10/2 = 5$ units of x_3 to be produced and each unit would yield a contribution of $1\frac{1}{2}$. Hence the total increase was $10 \times (1\frac{1}{2}/2) = 7\frac{1}{2}$; that is, in words, the product 2 contribution per unit of its limiting factor multiplied by the capacity of that limiting factor. Consequently, if this figure is greater than the corresponding ones for either product 1 or product 2 the pivot step will lead to the greatest possible increase or 'steepest ascent'. Clearly, the conventional simplex rule does not guarantee steepest ascent since it considers only the objective function coefficient (i.e. $1\frac{1}{2}$) and ignores both the capacity and usage of the limiting factor.

The marginal costing rule suggested above ignores limiting factor capacity but does at least take account of contribution per unit of limiting factor. Thus the simple modification of multiplying contribution per unit of limiting factor by the amount of limiting capacity is sufficient to turn the marginal costing rule into the conventional method of steepest ascent. Indeed there is a strong case to say that this is a a more reasonable extension of the single constraint rule since, as a general principle, it is always safest in marginal costing to think in terms of the actual extra total contribution that results if the considered action is taken. If this approach is accepted the usual 'contribution per unit of limiting factor' rule can be regarded as a special and unusual case. Since there is only one constraint all products have the same limiting factor and hence the same total limiting factor capacity. Consequently, total contribution increase depends solely on the ratio of c_i/a_i.

Now that the relationship between the marginal costing rule and simplex has been established, it is easy to show that the approach used in the example can readily be generalised and extended to many constraints and many activities. Firstly, of course, if the variable to enter the basis is selected according to contribution per unit of limiting factor multiplied by limiting factor capacity, the marginal costing rule is just another name for 'steepest ascent' simplex which is already quite general.

If the selection is made simply according to contribution per unit of limiting factor the method is still perfectly general. This is because only activities with a positive objective function coefficient are considered in any round. Thus at each step profit must increase and, since only a finite number of basic solutions exist, this method must eventually reach the optimum. Indeed, there is no reason to believe that it would take a longer path than conventional simplex and in the example the path was actually rather shorter.

5 Summary and conclusions

It has been demonstrated that in product-mix problems with a single constraint the traditional marginal costing rule is perfectly correct. Also if in addition to a single constraint there are upper bound constraints, perhaps sales constraints, the traditional rule requires some extension but can still handle the situation perfectly well. Indeed it seems likely that in either of these cases the appropriate marginal costing technique might well be rather faster than conventional simplex.

The general case is more interesting because the marginal costing rules are not only quite capable of perfectly general application but one particularly sensible interpretation will typically reach the optimum in fewer pivots than conventional simplex. This is because it transpires that when generalised the marginal costing rule is in fact no different from steepest ascent simplex. Unfortunately, the steepest ascent method is not very important from a practical point of view since on average the path is not much shorter, whereas the extra effort of finding the limiting factor each time for every activity is rather great.[14]

Acknowledgement

I should like to thank H. Hart, Department of Economics, University of Southampton, for persuading me to write this paper in the first place and for bringing my attention to what in Section 3 I call the single cascade principle.

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[14] See Hadley, op. cit., p. 112.

Equity Accounting and Investment Value: Another View

D. Maund and G. R. Young

In a recent article in this journal[1] Professor Ma came to the conclusion that,

> 'equity accounting is an improvement on historical cost accounting and represents progress towards better reporting in the financial statements'.[2]

This conclusion was reached because it was shown that in some situations,

> 'equity accounting would give an investment value in the investor's books equal to the true value of the investment'.[3]

We have no argument with the analysis presented but rather with the selection of the particular definition of 'true value of the investment' and the consequent avoidance of the main issue – that is, whether the value placed on the investment in an associated company should be determined by going directly to the market, as suggested by Professor Ma, or whether the underlying assets should be the basis of the valuation.

The equity method of accounting for investments in other companies values those investments as a proportion of the aggregate value of the underlying assets rather than by obtaining a value for the investment by use of share prices. Obviously, use of the method is only appropriate in cases where the value of the underlying assets is the determinant of financial position and income: in other situations financial position and income will be determined by share prices.[4]

No convincing arguments have yet been presented that indicate which investments, if any, fall into the first category. The statements of the professional bodies in Australia, England and Wales, and the United States of America[5] all suggest 'significant influence' as the primary test of whether the equity method should be used, but fail to relate this in any way to the determination of financial position or income. Professor Ma has dismissed the distinction altogether, assuming that all investments should be valued in terms of share prices.[6] In this paper we attempt to identify the situations in which the use of the equity method is appropriate.

Ownership of ordinary shares in another company may result in two types of benefit[7] being received by the investor; firstly the receipt of dividends, and secondly, the accrual and eventual realisation of capital gains.[8] Dividends depend on, and are paid

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[1] Ronald Ma, 'Equity Accounting and Investment Value', *Accounting and Business Research*, No. 6, Spring 1972. pp. 151–155.

[2] Ibid., p. 155.

[3] Ibid., p. 155.

[4] In all situations, of course, dividends are a determinant of financial position and income.

[5] (i) Australian Society of Accountants, 'Accounting for material investments in other Companies by consolidation and by the equity method'. Exposure Draft, July 1971 and 'The use of the equity method in accounting for investments in subsidiaries and associated companies.' Exposure Draft, September 1973.
(ii) Institute of Chartered Accountants in England and Wales, First statement of standard accounting practice, 'Accounting for the results of associated companies.' January 1971.
(iii) American Institute of Certified Public Accountants, Accounting Principles Board Opinion No. 18: 'The equity method of accounting for investments in common stock.' June 1971.

[6] Ma, op. cit., p. 151. This assumption in fact makes the equity method inappropriate in every situation unless, by coincidence rather than design, it produces a current market value. The qualifying assumptions in Ma's analysis mean that coincidence is unnecessary for a current market value to be obtained.

[7] There may of course be other indirect benefits such as the effects of inter-company transactions, joint use of facilities and other forms of co-operation.

[8] The reference to the two types of benefits is best expressed by the conceptual share valuation model

$$P_o = \sum_{t=1}^{n} \frac{Dt}{(1+k_e)^t} + \frac{Pn}{(1+k_e)^n}$$

Where P_o is the market price of a share at time O, D represents the expected dividend at the end of period t, P_n the market price of the share at the date of disposal n, and k_e the market discount rate appropriate for the risk share involved.

out of, the reported profits of the investee. Two measures are significant – the measure of the dividends paid and the measure of the stock from which they may be paid. These measures are derived from the reports of the investee. Capital gains arise from, and are measured by, changes in the market price of the shares of the investee. These gains are influenced by changes in the investee's financial position and by the accounting reports which attempt to reflect those changes, but the measure of the capital gain can only be derived from share prices.

It is possible to conceive of a purely speculative investment. This we would define as one which will only be held so long as, in the investor's view, no other potential investment offers a higher expectation of returns through dividends and capital gains, after adjusting for differences in perceived risks. The quoted market price of the shares is the measure of primary interest to the investor in this case: it both measures the gains he receives (after adjusting for dividends) and is an essential input to any decision he makes in respect of those shares. To account for these purely speculative investments requires only the application of the preferred valuation basis.[9]

At the other extreme we could conceive of an investment which has no speculative element. This we would define as an investment which will be held until the liquidation of the investee irrespective of changes in share prices or of expectations about those prices. For such investments, if they exist, the quoted market price (or any market value for that matter) is irrelevant in determining the financial position or income of the investor: market prices are determined by, and are relevant only to, purchases and sales.

In this case the asset is already owned and sale, by definition, is not contemplated; it is the financial attributes of the underlying assets which are relevant to the determination of financial position and income. To record an investment in shares of this nature at a market value pertaining to those shares would be just as inappropriate as accounting for the investor by reporting, for example, the current price at which the investor's shares are being traded.

If these arguments are accepted it follows that to account for investments with no speculative element the assets underlying the shares which are owned must be accounted for rather than the shares themselves. This is what the equity method does. The central issue involved in considering the equity method of accounting is whether, in certain situations, it is more appropriate to account for the assets underlying an investment in shares[10] or the shares themselves.[11]

> It is interesting to note that by assuming that the 'true value (of an investment) is . . . identical with the normalised current market value of the investment',[12]

Professor Ma ruled out consideration of what seems to us to be the central issue in equity accounting, and the only theoretical grounds on which its adoption can be justified.

So far we have only considered purely speculative investments and investments with no speculative element. While the former presumably exists, it is doubtful whether many, if any, investments would fall into the second category. The majority of investments are likely to contain both speculative and non-speculative elements. Few investments would be considered to be irrevocable and on revocation a capital gain or loss will be realised. Once revocation is contemplated quoted market price is essential for decision-making; once revocation is planned quoted market price is a determinant of income. However, unless some investments can be identified as being essentially non-speculative in nature, no case appears to exist for the use of equity accounting.

The main problem here is that the distinction is dependent on management intention. We are of the opinion that, ideally, accounting reports should be independent of management intention.[13] Measurements of management intention are unlikely to be accepted as being sufficiently objective and verifiable to be a determinant of financial position and income. What is required then are sufficiently reliable indicators of whether an investment in shares is essentially speculative or non-speculative.[14]

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[9] It is not the purpose of this paper to debate the relative merits of various valuation bases. It should be pointed out however, that in the case of marketable securities held for speculative purposes, the limitations of historical cost are particularly apparent. Also the case for the application of a strict realisation test seems particularly weak when a current market value is easily obtainable and verifiable.

[10] Where the investor is in a position to control the investee, the assets underlying an investment are accounted for in consolidated statements but this is not as an alternative to some other type of valuation: it is accounting for a different entity, the group of companies.

[11] F. L. Clarke has made the same point:
'A distinction should be drawn between –
(a) the monetary measure of the *entitlement* to the rights, and
(b) The monetary measure of the *rights* – conferred by the holding of shares. The monetary measure of the *entitlement* to the rights is represented by the price for which those shares may be exchanged in the market; the monetary measure of the *rights* is the aggregate of the monetary measures of what the rights represent.'
See 'Equity Accounting – An Enigma,' *Chartered Accountant in Australia*, July 1971, p. 7.

[12] Ma, op. cit., p. 151.

[13] A similar problem arises if it is desired to choose between current cost and net realisable value as a valuation basis in accounting – value to the firm can be shown to be either current cost or net realisable value depending on management's intention with respect to each asset.

We believe that if such a distinction can be reliably made then the equity method of accounting is useful. In general it may be expected that the owner of a speculative investment would focus major interest upon the shares representing the investment, the regularly quoted market prices thereof and respond readily and quickly to significant changes in the quoted market prices of those shares. On the other hand, the owner of a non-speculative investment would be expected to focus major interest upon the assets comprising the investment and the periodic measure of the product of those assets and to respond to the ratio of the money measures of his share of that product to his share of the assets generating that product.

Conclusions

What Professor Ma has demonstrated is that under certain conditions the equity method would produce values closer to what he has defined as the 'true value of the investment' than would be obtained using historic cost. On these grounds the equity method was judged to be an improvement over historic cost. However, the equity method relies on some valuation base. As envisaged by the professional bodies when making their recommendations and as implicitly assumed by Ma, this *is* historic cost. The equity method, as discussed, is not a departure from historic cost but, rather, the utilisation of different historic costs. Regardless of whether historic cost, current cost, or some other valuation basis is used, the equity method is equally appropriate or inappropriate: the equity accounting proposal and selection of a valuation base (or bases) are independent issues. The suggestion by Ma that accountants should depart even further from historic cost and use the normalised current market value of the investment misses the point. If current market values were used the question would remain as to whether the current value of the shares themselves or some aggregation of the current market values of the underlying assets should be used.

Despite these conclusions it seems necessary to point out that embellishments such as equity accounting do nothing to overcome the inherent weaknesses of historic cost accounting. To superimpose the equity method on a historic cost system cannot produce meaningful information.[15] The apples and oranges problem remains.

We have attempted to demonstrate that the equity method of accounting for inter-company investments is appropriate in those cases where the inter-company investment is essentially non-speculative. The major practical problem in the implementation of the equity method is that of finding sufficiently reliable criteria for distinguishing investments which are essentially non-speculative from other investments. Criteria suggested so far are either too vague to result in consistent application and/or their relationship to the non-speculative nature of investments has not been adequately demonstrated.

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[14] The recommendations of three professional bodies have used the percentage ownership of shares in the investee as the primary criterion basing this largely on a notion of significant influence. The rationale for this criterion has been inadequately presented so far.

[15] This point has been clearly made by Clarke, op. cit. p. 8.

Portfolio Theory, Corporate Objectives and the Disclosure of Accounting Data

Simon M. Keane

The framework in which the form and content of corporate financial statements have evolved is one in which

(1) the classic objective of business enterprise is assumed to be the maximisation of existing shareholders' wealth,

(2) the welfare of the company's shareholders has been pursued and their information needs described in isolation from their holdings (actual or assumed) of other financial assets, and

(3) corporate financial reports are directed to the 'reasonably informed investor'.[1]

Recent elaborations of portfolio theory and capital market theory indicate that shareholders' informational needs cannot be specified except in the context that the shareholders are assumed to hold diversified portfolios and that publication of data to serve their needs should be directed primarily to the most sophisticated investors in the market.[2]

In this paper, a potential source of conflict is noted between a corporate financial operating objective of maximising existing shareholders' wealth and a corporate financial reporting objective which directs the publication of data concerning that wealth to sophisticated information-processors in the market. Some reservations about the validity of the wealth-maximising criterion are proposed in the light of portfolio and capital market theories and the possible consequences for corporate disclosure policies are examined.

One of the chief criticisms levelled at recent efforts by the accounting profession to promote improvement in the quality of published information is that there is a lack of direction due to the absence of agreement concerning the objectives of financial reporting and the intended users of corporate financial reports. The conventional responses to the three fundamental questions (1) for whom is accounting information published? (2) what purpose does accounting information serve? and (3) how much information should be disclosed? are that the information is directed to a wide variety of users but primarily to the company's shareholders;[3] the purpose of the information is to inform the economic decisions of the various users, but primarily the 'buy-sell-hold' decisions of the shareholders;[4] and the amount of information should be governed by the primary criterion of relevance to the assumed informational needs.[5]

Although the principle of full disclosure of all relevant accounting information is well established, the observed absence of widespread voluntary disclosure of data before compulsion by statutory regulation or professional recommendation indicates a general reluctance by a majority of companies to disclose more than they need to, and a tendency to interpret the minimum requirements as maximum standards of disclosure. The disclosure practices that ultimately become incorporated in the statute book or required by the regulatory agencies, frequently originate as voluntary experimental efforts by a few leading companies. The failure of other companies to follow that leadership before being compelled to do so may be simply due to apathy, or management's fear of criticism, or to a belief that the only objective test for relevance of information is that which is embodied in legislation or in the rules of the appropriate regulatory bodies.

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[1] See, for example, Eldon S. Hendriksen, 'Accounting Theory' (Irwin), p. 561.

[2] Report of the Committee on Research Methodology in Accounting, *Accounting Review* (Supplement to Vol. XLVII 1972), pp. 426–427.

[3] This is implied by the fact that the Annual Reports of companies are addressed to the shareholders. See Hendriksen, op. cit., p. 559.

[4] See George O. May, 'Memories and Accounting Thought', Ronald Press Company, 1962, p. 67.

[5] American Accounting Association, 'Statement of Basic Accounting Theory', p. 9.

But, without doubt, management's concern for the shareholders and the possible adverse consequences of increasing the quantity and complexity of the informational load has had a significant influence on the form and content of financial statements. In pursuit of their shareholder-centred objectives, management's preparedness to exceed the minimum disclosure requirements will be influenced by their expectations of the effect the additional data will have, and in particular by the following considerations:

(1) *The share price*

Management may fear that the publication of the data may cause the share price to fall. The hesitancy, for example, of the great majority of companies to present statements indicating the effects of changes in the purchasing power of money during periods in which such changes have been substantial, must, in part, be due to the possible effect on the share price of reporting lower earnings.

(2) *Competitors*

Relevant data may be withheld rather than provide competitors or customers with information which might be useful to them. The provision of segmented information, for example, by conglomerates in respect of earnings by product lines or geographical region, might be thought to be an unnecessary concession to competitors or to large customers of specialised businesses.[6]

(3) *Understandability*

Doubts about the users' capacity to assimilate additional data may deter management from increasing the quantity or complexity of information.[7] The disclosure of accounting data is an evolutionary process which reflects management's and users' level of sophistication but the pace of evolution will be affected by the accepted view about who is the primary user of accounting information and about the degree of technical skill the user is assumed to possess. The presentation, for example, of multi-column statements prepared on alternative accounting bases, or the inclusion of probabalistic data, might, even if believed to be useful, be thought to give advantage to the more technically skilled interpreter and serve only to confuse the ordinary user.

(4) *Conservatism*

The reluctance of management to publish financial data which might prove to be an overstatement of the realities has led to a characteristically cautious approach towards innovation and experimentation in accounting data. Understatement or silence has been the tool which the accountant has conceived as being the appropriate one for dealing with conditions of uncertainty, and nowhere is this more true than in his traditional unwillingness to associate himself with public forecasts of financial data. In the trade-off between relevance and objectivity, accountants, understandably, have tipped the balance in favour of the latter.

(5) *Uniformity*

Managers may hesitate to introduce changes in the form or methodology of accounting statements out of deference to the widely held view that departures from uniform practice lead to a lack of comparability with other companies and present obstacles in the way of shareholders' valuation procedures.[8]

The implications of portfolio theory and the efficient-market hypothesis in determining the objectives of financial reporting and in identifying the users of financial statements will now be examined, and then, in the light of a critical examination of the wealth-maximising goal, the above disclosure-inhibiting influences will be reconsidered.

Portfolio theory

The fundamental lesson of portfolio theory is that rational investors without inside information or special insights will hold well-diversified portfolios and that corporate shareholder objectives cannot be framed in terms that do not take account of the fact that the company's shares are a constituent element of a portfolio. Many shareholders may, in fact, not be efficiently diversified or may have no more than a speculative interest in the movement of the share price, but it is assumed that corporate objectives should be constructed to meet the needs of efficiently diversified shareholder-investors rather than inefficiently diversified shareholder-speculators. In addition, since the actual composition of the portfolios of a diverse and constantly changing body of shareholders cannot be ascertained or continuously monitored, it must also be assumed by management that their portfolios are coincident with the market portfolio, that is, the portfolio of all financial securities in the market. The problem of goal-setting has, then, features analogous to that of establishing a community of interests in a conglomerate organisation or a divisionalised company with decentralised profit responsibility. The manager of a division with substantial autonomy, must, when pursuing the divisional goals, constantly bear in mind the best interests of the total company, and when the goals of the division conflict with those of the company he must defer to the overall objective. Likewise, corporate financial managers should frame their corporate financial objectives in terms which can be reconciled with the goals of an efficient capital market.

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[6] A. A. Sommer, Jr., 'Conglomerate Disclosure: Friend and Foe?' *The Business Lawyer*, January 1967.

[7] Arthur Andersen and Co., 'Objectives of Financial Statements' 1972, p. 85.

[8] AAA Basic Accounting Theory, p. 17.

The function of the capital market is essentially one of facilitating the purchase and sale of financial securities to promote efficient allocation of resources with minimal costs of transfer. Its allocational efficiency is determined by its success in directing the savings flows to the most profitable uses, and in stimulating additional savings and investment. The primary objective, therefore, of the capital market may be perceived in terms of maximising the prospective return on capital to investors for a given level of risk.

The efficient-market hypothesis

There is a strong body of empirical evidence to support the hypothesis that the market for securities is efficient in the 'semi-strong' form,[9] that is, that all publicly available information is instantaneously impounded in the share price, and that the analysis of published information cannot enable an investor to achieve returns in excess of a naive buy-and-hold strategy, using a dart for selection. There are no superior trading rules based on past security behaviour (technical analysis) and therefore the search for undervalued or overvalued securities will not yield a higher than average return, except by short runs of good luck. Only if investors are privy to inside information can abnormal returns be achieved over the long term.

There has been and undoubtedly will continue to be a marked resistance, outside the academic world, to accepting the evidence of the efficient-market hypothesis, since the securities market's infrastructure has been erected on the basic assumption of the market's inefficiency. The vast number of fundamental analysts, chartists, stock-market periodicals, investment clubs and professional investment advisers all bear witness to the entrenched belief that the collection and the skilful appraisal of published data can assist investors to discover and profit from transacting in undervalued and overvalued stocks. Despite several studies published over a period of years which indicate that investment institutions are unable to achieve superior returns over the long-term, the fact that over short periods of time some institutions (and individuals) will inevitably perform better than others, makes the acceptance of the long-term statistical evidence difficult for market participants. It requires a heroic effort on their part to approach with the necessary perspective and independence of mind a body of evidence which supports the view that their judgment can do no better than chance.

For the purposes of this paper, the findings of the efficient-market surveys are accepted as being substantially validated. That is not to say that it is vital to the arguments that follow, that one should believe that no individuals exist or might exist who could outguess the market in identifying undervalued or overvalued securities, but simply that the evidence points firmly to the rarity and exceptional nature of such individuals.

The shareholder wealth-maximising objective

The traditional economic objective of profit-maximisation has been developed into maximisation of the value of the firm to the existing shareholders, because the latter takes account of investors' time and risk preferences. It is, in fact, an extension of the net present value rule which forms the basis of modern capital budgeting theory and which advises the acceptance of projects whose returns are in excess of the required minimum return. Clearly that rule is derived from a market which is assumed to be imperfect and inadequately competitive. The possibility of undertaking projects with positive NPVs when the cash flows are discounted at the capital suppliers' required rate of return would not normally present itself in a perfect market because the implication of a $\text{NPV} > 0$ is that there is imperfect competition for industrial projects or that the rate of return sought by investors is too 'low' in relation to productive opportunities. Only the truly innovative project could be expected to yield a surplus return. The typical project would be accepted because its NPV was non-negative rather than positive, that is, because it met rather than exceeded the minimum requirements of the suppliers of capital. Therefore, in a highly competitive industrial market combined with a capital market in which the 'cost of capital' was free to find its natural level, the wealth-maximisation objective would not be attainable, because the opportunities to undertake projects which had surplus returns to contribute to the wealth of existing owners would rarely present themselves.

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[9] For example, Fama, 'Efficient Capital Markets: A Review of Theory and Empirical Work', *Journal of Finance* (May 1970).

The required return on capital is invariably described in finance literature as the 'cost' of capital. The term is clearly derived from a management viewpoint, because, to the suppliers of capital, the interest rate or capitalisation rate will be perceived not as a cost but as the profit or return on capital. It is understandable that management should perceive the minimum required rate of return as target to be reached or improved upon, but the danger of describing it as a cost is that it is then represented not just as a target to be achieved but as a burden to be minimised. This conception of the 'cost of capital' is a logical outcome of identifying the wealth-maximising criterion with maximisation of the market price of the shares. The price of a share is equal to the discounted value of the future stream of dividends and is therefore inversely related to the discount rate, or equivalently, to the 'cost' of equity capital. The pursuit of the primary goal of maximising the price of the shares has led to a secondary goal of minimising the 'cost' or minimum *ex ante* required rate of return on the shares for a given level of risk. We observed that the function of an efficient capital market was to maximise the *ex ante* return on capital for a given level of risk, and this apparent conflict between corporate and market goals will now be examined.

A reduction in the cost of capital by a lowering of interest rates and a consequent reduction in the cost of equity capital (which is a function of the cost of debt plus, if appropriate, a premium for risk) provides a signal to financial managers to include in their schedule of possible projects a whole range of new investments previously rejected for having inadequate rates of return. If the reduction in interest rates is unaccompanied by an increase in the flow of investible funds, the effect may be to disrupt the allocation process of the market by undermining the relevance of the interest rate as a criterion of efficiency.

The rate of interest represents to the supplier of capital the reward for abstaining from consuming his current wealth. To the manager who acts as steward of his capital, the interest rate represents a hurdle to be surmounted. A reduction in the hurdle rate may motivate the manager to undertake projects hitherto considered to be marginal, and since the total inflow of funds is unlikely to be increased in response to a reduction in the prospective rewards, he will have to compete with a greater number of claimants for the available funds. The probability of the funds being allocated to the most profitable projects is decreased if the mechanism by which profitability is assessed is distorted.

If, as a result of institutional factors or government interference with the forces which determine the 'natural' rate of interest (that is the rate of interest which reflects the opportunities available on productive investments), the market rate of interest and (sympathetically) the minimum required rate of return on equity are 'low', then net present values will continue to present themselves and the NPV rule will remain the most effective operational guideline to achieve the optimum exploitation of them. But present-value or wealth maximisation should not, as a result, become enshrined as the ultimate objective of business activity. The present value rule has led to the widely held belief that a high present value is intrinsically preferable to a lower present value. But this, in fact, is necessarily true only for a given cost of capital. It is not self-evident that shareholders prefer conditions in which a low stream of dividends is discounted at a low rate of interest to conditions in which a higher stream of dividends is discounted at a higher rate of interest for the same level of risk, even if the former stream has a higher present value. A combination of high present value and low prospective returns is necessarily preferable to a combination of low present value and high prospective returns to investors about to dispose of their investment. The latter combination might be preferred by investors intending to remain investors. In Table 1, two possible states of the world are described. In state X, a low dividend stream and low discount rate produce a present value of £200. In state Y, a high dividend stream and high discount rate produce a present value of £195. The first state is consistent with the wealth-maximising goal, the ultimate outcome of which, namely high disposable value and

TABLE 1

State	Perpetuity of dividends	Capitalisation rate	P.V. Time O	Wealth Time 1
X	£10·0	5%	£200	£210
Y	£19·5	10%	£195	£214·5

low prospective returns, is likely to induce investors to wish to cease to be investors. The second state corresponds with the market objective of maximising the prospective rewards for capital and making investment more attractive than current consumption.

It has been noted that in perfect markets, the typical project would have a rate of return approximately equal to the required rate of return and would therefore be *rejected* by the wealth-maximising rule because no significant contribution would be made to the wealth of the existing owners. It would not simply be a matter of indifference whether marginal projects were accepted or not because their rejection would force some potential suppliers of new capital to purchase existing equity securities, causing the 'cost of capital' to fall and share prices to rise. The effect of a reduction in the cost of capital is that projects previously rejected on the grounds of being marginal now acquire positive NPVs and therefore become acceptable. But it also widens the gap which separates the required return on capital funds from the required return on capital goods and therefore causes a distortion in the allocatory mechanism. Companies understandably regard the cost of capital as a criterion of efficiency and a reduction in the level of interest rates will entitle inefficient companies to compete for capital with efficient companies which are capable of generating returns substantially above the cost of capital. In addition, the belief that high share prices and low interest rates are *per se* desirable encourages industrialists to persuade Governments to exert pressures to keep down the level of interest rates without regard to the consequences of distorting the efficiency criterion. The most effective allocation of resources will be achieved only if the cost of capital equals the yield on the project which makes the most effective use of the last pound of available funds, and a reduction in the interest rate is desirable only if all potential projects with NPVs = 0 have been exhausted.

To sum up, then, the primary economic function of industrial companies is to create wealth, not simply in the conventional sense of producing excess present values, but in the sense of translating funds into productive investments yielding the rate of return required by the suppliers of capital. If conditions are such that the minimum *ex ante* rate of return required by new suppliers of capital is less than the *ex ante* return expected from new projects, then exploiting the disparity between the returns to benefit existing shareholders is a legitimate pursuit, even although the existence of the disparity may create an obstacle to the efficient allocation of capital, and the positive net value rule and share price maximisation are the most effective criteria for achieving this goal. Indeed, by observing these criteria, companies will tend, in time, to eliminate the conditions which give rise to the disparity and therefore the rules which focus on exploiting it will cease to have much relevance. But if the rules are elevated to the status of being the primary rationale of business enterprise, then the logical conclusion would be that companies should not only apply the rules when operating under imperfect conditions but should seek to perpetuate those conditions, for example, by rejecting projects which satisfy the needs of new suppliers of capital but make no significant contribution to existing owners' wealth, or by pressing governments to strive for artificially low interest rates, or by declining to volunteer information not required by regulation which might depress the value of the shares. But if the corporate role is perceived in a broader market context, management will more readily recognise that the welfare of shareholders who hold a market-portfolio will be served by the share-price maximising criterion only to the extent that corporate activity is designed to promote rather than to frustrate an efficient capital market.

The objective of corporate financial reports can now be specified and the primary users identified.

Corporate financial accounts may be used by a number of parties for a number of purposes, but from the shareholders' point of view the purpose is threefold:

1. to provide the market with data to establish the market price of the company's shares,[10]
2. to provide information to enable investors to make their buy-hold-sell decisions, and
3. to account to shareholders for management's stewardship of the company's resources.

Each of these reporting objectives will now be considered in detail.

The establishment of market prices

Although corporate financial reports are conventionally addressed to the company's shareholders, their primary function is to provide the market with data needed to establish the price of shares. The conventional notion of providing information for investors to evaluate the shares, and to compare their valuation with the market price of the shares to produce a basis for their buy-sell-hold decisions has ceased to have any real significance in the face of the efficient market evidence. By the 'market' in this context is meant the stock exchange jobbers who adjust the share price in response to new information, and the sophisticated investors who act instantaneously on publication of the data. Since their analysis and response effectively adjusts the price to its 'intrinsic' value, it follows that they are the primary users of accounting data. It might be asked what advantage is there for investors to press for more disclosure of information if it will be instantaneously reflected in the share price. Clearly, to the investment analyst seeking to outguess the market, there is no advantage, and to the privileged insider there is a positive disadvantage. By providing more complete information, more quickly, the market price of the share at any time will represent not only the 'intrinsic' value in relation to all published information, but more closely than before to all available information. As the published data becomes more technical and complex, the gulf which separates the naive outsider from the informed outsider is widened. But, equally, as it becomes more complete, the gulf which separates the privileged insider from the informed outsider is narrowed. There is no advantage for the naive outsider to demand that published information should be tailored to suit his limited understanding. The more efficiently the price-setting mechanism operates, the greater assurance has he that the market price is fair, and the less need for him to consider whether the share is over- or under-valued in relation to other securities.

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[10] See Report of the Committee on Research Methodology in Accounting, op. cit., p. 408.

If it could be demonstrated that the market was not so efficient as to cause prices to adjust instantaneously to new information, then the publication of additional, more technical, accounting data could be viewed as conceding an advantage to the specialist investor. But such an advantage would be preferable from the point of view of the ordinary investor to the alternative of maintaining an advantage for the unscrupulous insider. Withholding relevant data which, because of its technical nature, might have given privileged and profitable insights into the intrinsic value of the share to a few specialist investors cannot actually benefit less skilled investors or enable them to make more useful evaluations of share prices. Their welfare would still depend on the allocatory efficiency of the capital market. The granting of a reward to investors with specialist knowledge is a small price to pay to promote that efficiency. The long-term interests of the naive investor are best served by an improvement in the price-setting machine, combined with a clear recognition of his own analytical limitations and that if he wishes to engage in serious investment rather than speculative ventures he should do so under the guidance of an informed adviser.

Buy-sell-hold decisions

The efficient-market hypothesis implies that there are no investment selection rules which permit better than average performance. That is not to say that the use of a dart is the recommended technique for selecting securities. The choice of securities to be included in a portfolio requires considerable judgment and analysis in order to ensure that the total portfolio meets the individual investor's income, risk, and policy preferences. Therefore, although the ordinary investor may not be concerned directly with the technical data published in the annual reports to service the price-setting mechanism in the market, he will require information concerning the company's dividend policy, product lines and diversification plans, and social and economic policies to enable him to decide whether that company is a worthwhile candidate for his portfolio.

Management's stewardship

Management is accountable not only for its honest use but for its efficient and responsible use of resources. The cult of share-price performance and the resulting practice of switching in and out of securities have relieved many shareholders of a sense of purpose in offering constructive criticism of management's effectiveness, and indeed the common method of demonstrating dissatisfaction is to dispose quietly of the securities. Institutional investors have been especially guilty[11] of a reluctance to voice criticism of companies in which they have invested to avoid the possibility of adversely affecting the market value of the shares. But since the efficient-market hypothesis supports a buy-and-hold strategy as being optimal, investors would benefit themselves and overall business performance if they held on to their securities and participated more actively in monitoring management's achievements.

Clearly, many shareholders do not have the expertise to provide useful criticism to management and must depend on more constructive participation by institutional investors and more relevant guidance from the many financial advisers and analysts whose researches would be better directed to identifying areas for management improvement than fruitlessly seeking to outguess the market.

In addition to reporting on their honesty and efficient use of resources management must provide information to enable shareholders to assess the manner in which the resources have been used. Corporate economic and reporting objectives have evolved out of a philosophy in which the shareholder-centred objective held a dominant role and the welfare of shareholders has been interpreted in isolation from the rest of the community. But in recent years much has been written about corporate accountability to society and the adoption of socially relevant policies, a development which from the traditionalist standpoint represents a direct challenge to management's responsibility to the owners. Some companies are able to accept greater social awareness as one of a multiplicity of conflicting objectives which management must serve in pursuing its primary profit goal, and recognise that it is necessary to come to terms with the problem of maintaining a coherence of effort.[12] To others, the potential conflict between the profit goal and social responsibility necessitates a complete review of the primacy of the profit objective. Certainly, the conflict is accentuated by the conception of business operation as a campaign conducted by management against several adversaries – competitors, customers, creditors, labour, etc. – to achieve the maximum benefit for the owners. Society at best is portrayed as a constraint upon management's efforts, and at worst as one of the adversaries. Each response the company makes to the demands of society represents an incursion into the owner's residual profits.

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[11] R. J. Briston, 'The Stock Exchange and Investment Analysis', George Allen and Unwin, p. 410.

It is not suggested that any restatement of the profit goal will instantly resolve the issue concerning the relative weighting to be given to commercial pressures and social demands, but a better perspective may be achieved if the welfare of portfolio-efficient shareholder-investors is recognised to be centred on the efficiency of the market and not, as implied by the wealth-maximising objective, on the exploitation of the market's imperfections and of the total environment. In a society in which the suppliers of capital are believed to be entitled to be paid a price for the use of their funds, the rate of interest, and, by derivation, the 'cost of capital', are the market's mechanism for expressing society's evaluation of a fair reward for capital investment. To the extent that the aggregate of business enterprises apply a positive net-present-value criterion to their productive investments, then, on average, the business community will achieve returns in excess of that 'fair reward', and the amount to be allocated from that excess to socially desirable ends is a matter for management to interpret through the shareholders. The latter are the representatives of the capital market, which in turn, directly or indirectly through insurance companies, unit trusts, pension funds, etc. represents the collective judgment of society.

With financial operating and financial reporting objectives perceived as being centred on the market rather than on the shareholders, it is now possible to re-examine the considerations identified in the introduction of this paper as being likely to inhibit management from disclosing data which is relevant but not required by statute or professional recommendation.

1 The share price

In view of the pressure to pursue a policy of promoting shareholders' wealth by maximising the share price, it is not surprising if management is hesitant to publish data which might cause the share price to fall. It has been shown, however, that the welfare of efficiently diversified shareholders is more closely tied to the performance of the total market than to the capacity of individual companies to exploit the imperfections in the market, and will be advanced more by the provision of data to enhance the efficiency of the market than by the withholding of information to prevent adverse adjustments in the market price. It is true that some shareholders will not, in fact, be efficiently diversified and may attach greater significance to a high disposable value for a particular company's shares than to the efficiency of the total market, but, as previously stated, the principles governing the extent of disclosure of accounting data cannot be constructed to accommodate the inefficient or speculative portfolio positions of individual investors. The share-price is the exit-value for the seller of shares and the entry-price for the purchaser and the function of the capital market is to establish a fair market value, not as high an entry price as possible to the newcomer. Only disclosure of all information relevant to the determination of the share-price will achieve that fairness and the only investors who can reasonably object to that criterion are those who propose to disinvest and cease to be participants in the capital market.

The creation of a relative disadvantage in a merger negotiation by volunteering information which may tend to depress the company's share price does present a conflict. Prior to any disclosure enforcement by statute or regulatory agency, companies who take the lead in providing the market with what is believed to be relevant data appear to be placing themselves at a disadvantage in relation to companies who place the corporate status within the market above the interests of the market itself. All that can be said is that the management of companies who perceive their position so disadvantaged when confronted with a merger should in their communications to the shareholders attempt to quantify the relative disadvantage and so place themselves in a comparable position.

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[12] Raymond A. Bauer and D. Fenn, Jr., 'The Corporate Social Audit', Russell Sage Foundation 1972, p. 97.

2 Competitors

It was noted that corporate managers' problem of achieving a balance between company and market objectives was analogous to the divisional manager's problem of reconciling divisional goals with those of the company. There will always be a certain amount of information, e.g. secret processes, which, quite properly, should be regarded as confidential to the company. Other information, however, may not be so readily classified as confidential or public. Nonetheless, concern about disclosing data which might cause competition to be keener is less likely to influence a management seeking to serve an efficient market than one which places the value of the company's shares *vis-a-vis* other securities above all other considerations.

3 Understandability

A corporate financial report is a vehicle for communicating useful information and it is important that a form and style of communication which is comprehensible to the user should be selected. It is therefore critical that the user be identified and the level of his comprehension be defined. Since it is the sophisticated interpreter who determines market share prices it is his level of comprehension which is relevant. Any effort directed towards making accounting statements understandable to the average or even 'reasonably well-informed' investor may do a disservice to him by implying that there is a shortcut method of carrying out the highly complex process of valuation more efficiently than the market.

There is evidence to suggest that information processors' judgment is diminished beyond a certain level of complexity. H. Miller[13] has expressed concern that if tests carried out by behavioural scientists can be shown to be applicable to the financial reporting environment, there may be an optimal loading of financial data beyond which there is a tendency for the user to resort to fixed decision rules, such as price-earnings ratios, with a consequent deterioration in decision-making. If it can be assumed that the optimal level of complexity varies with the decision-maker's capabilities, there are significant implications for accounting theorists. Miller observes,

'If the theorist is to design an optimal environment for financial reports and optimal levels vary for different processors, which optimal level is he to choose as his goal? The choices range from the most concrete to the most abstract processor with perhaps some average as an inviting possibility.'[14]

Miller's choice of processor fortunately accords with the findings of this paper, and the most skilled investor is selected. 'It seems intuitively wise to select the most abstract investor's decision model for financial reports. The selection of a more concrete processor . . . would deprive the sophisticated investor of information which might be crucial to his decision', and because of the widespread use of analysts' advice 'it appears likely that the creation of information environment that is optimal for the analyst will serve other investors as well'.[15]

Miller concludes that because more sophisticated users of financial statements have made repeated requests for additional information we have yet to exceed the analyst's optimal conceptual level and can therefore probably follow a data expansion policy now. However, he warns, 'we will eventually be limited and continual haphazard expansion will inevitably cause superoptimality and a reduction in the usefulness of financial reports for decision-making'.[16]

Whilst endorsing Miller's concern about the dangers of haphazard expansion, doubt must be expressed about his anxiety concerning the provision of excessive relevant data. The only effective test of whether relevant data is excessive is that market efficiency has diminished as a result of the increased information load, and that market share prices cease to approximate their intrinsic values as determined by the published data. But that would presuppose the existence of a sufficient number of sophisticated analysts who could process the increased informational load to determine the 'correct' intrinsic value and so secure an insight from which they could profit and, in so doing, eliminate the disparity between the market price and the intrinsic value. It is true that as the informational load is increased, some processors of a lower conceptual level than others would cease to rank among the body of 'efficient' conceptual processors, but provided the price of a share continues to be determined by the most efficient information processors, the loss of efficiency by the former processors would affect only their responsibility to recognise their limitations. If the increased load diminished market efficiency in the sense that there was a time-lag in what had previously been an instantaneous adjustment to new information, then, as stated earlier, such a concession to skilled analysts would be preferable to the alternative of maintaining a privilege for informed insiders and to a consequent reduction in the efficiency of resource allocation.

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[13] Henry Miller, 'Environmental Complexity and Financial Reports', *Accounting Review*, January 1972, pp. 31–37.

[14] Page 35.

[15] Page 36.

[16] Page 37.

4 Conservatism

It was noted that the accountant's traditional method of dealing with data possessing a low level of verifiability is silence or the adoption of a reserved approach in his choice of measurement method. In conventional accounting statements, probabalistic data are presented deterministically, that is in the form of unique figures which represent management's considered judgment in accordance with generally accepted accounting principles. A conservative approach implies the selection, from a probabalistic range of values, of a value which is less than the mean of the range. There is some rationale for this desire to hedge against the possible effects of an outcome which is more adverse than expected, whether the motive be to protect the reputation of the management or to protect the shareholders from the consequences of attaching unwarranted credibility to the reported figures. However, just as management must take account of shareholders' opportunity to diversify away much of the variability of an individual company's earnings, so must the reliability of accounting data be evaluated in a portfolio context. Shareholders possessing a well diversified portfolio can diversify out of measurement errors[17] of managements in individual companies, that is, measurement errors which are independent in nature. But the conservative approach of understatement creates a systematic bias at the portfolio level, a bias which cannot be diversified away. Additional research is necessary, therefore, to review the conventional yardsticks used in considering the trade-off between relevance and verifiability.

5 Uniformity

Lack of uniformity in corporate financial reports is clearly undesirable if it can be avoided without loss of relevance or utility. Insofar as uniformity of accounting practice might reduce the scope for introducing bias into accounting reports, then the achievement of uniformity will contribute to an improvement in the quality of accounting data. But to the extent that uniformity is desired to facilitate comparison of results between companies, then, in the light of the efficient-market hypothesis, the uniformity-flexibility controversy loses much of its poignancy. If the market prices of shares successfully impound current accounting data, it would seem that the primary users, the sophisticated interpreters of accounting statements, are able to make their assessments without the benefit of rigorous uniformity. Abstract processors are more likely to prefer an accounting measurement which is appropriate to the circumstances combined with disclosure of the basis of measurement rather than one which gives a spurious impression of comparability.

Conclusion

Given that it is in shareholders' best interests that information should be directed to the most efficient information processors in the market, it follows that the scope and complexity of disclosed information should not be circumscribed by any preconceived notion of the limited capacity of shareholders to assimilate and process the information. Nor should the extent of the disclosure be contained by management's efforts to provide a set of articulated statements which purport to encapsulate a measure of the firm's efficiency and the value of its economic resources in a specific form to comply with the requirements of the law and of 'best accounting practice'. The fact that there is substantial disagreement about which form is appropriate suggests that there may, in fact, be no unique form which can meet the needs of even one category of users, or, for that matter, any single theory of income or concept of value which can represent the firm's economic efficiency or financial condition. Those who use financial reports may find it necessary in making their economic decisions to view the company from a number of perspectives, to consider, for example, the historical costs of the company's resources before and after some adjustment for changes in the purchasing power of money, the realisable values of those resources, their replacement values, and perhaps even the cash flows which they have and are expected to generate. Yet accounting theoreticians frequently align themselves with one of those perspectives and seek to establish its primacy over others as if it were essential to represent the company's economic condition from one standpoint only and to report accordingly. But until such time as the users agree that there is a single perspective which encompasses all their needs it is not for management to choose only one of the range of possible methods or systems and to exclude the others. It is management's function to provide the data which the processors need to make their own evaluations, even if the data cannot be encased in a single coherent statement. The relevance of information, therefore, cannot be ascertained by some *a priori* principle, but only by identification of the needs of those who are recognised to be efficient processors of accounting information. It follows that withholding any information relevant to those needs is contrary to shareholders' interests except insofar as the information might concede a material advantage to competitors or conflict with legitimate internal goal-setting budgets. These considerations apart, only the fear of litigation remains to inhibit management from venturing beyond the minimum standards of disclosure, especially if the courts award crippling damages against those who are found to be negligent in the preparation or audit of financial reports. Management cannot be expected to co-operate enthusiastically with the spirit of innovation in accounting methodology, unless society, through the courts, takes the view that the potential consequences of negligence should be measured in the light of the facility for risk-avoidance offered by portfolio theory, and recognises that legitimate attempts to promote the efficient allocation of resources by improving the quality of published information are too important to be restrained by fears of disproportionate penalties.

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[17] Report of the Committee on Research Methodology in Accounting, op. cit., p. 425.

Summary

The implication of modern portfolio theory is that rational investors will be efficiently diversified and that, for operational purposes, shareholders may be assumed to hold portfolios composed of all securities in the market. Consequently, it is in shareholders' interests that corporate goals should be compatible with the goals of an efficient capital market. It was argued that the pursuit of the classic goal of maximising the current disposable value of existing shares may at times lead to attitudes and decisions inconsistent with the goals of an efficient capital market and therefore inconsistent with the interests of efficiently-diversified shareholders.

The empirical evidence firmly supports the market's efficiency in immediately absorbing all published information, and indicates that of the many potential users of and uses for corporate financial reports the primary users are not the company's shareholders but stock exchange jobbers and other sophisticated information processors. The primary purpose of providing them with the information they need is to enable them to perform their function of establishing market prices which approximate as nearly as possible to the intrinsic values of the securities, with the twin effect of relieving shareholders of the burden of ascertaining whether the prices are over- or undervalued and of helping to direct the efficient allocation of funds to the most profitable uses. Shareholders' interests are better served by the disclosure of all information relevant to the establishment of share prices and by their active participation in monitoring managements' economic and social effectiveness than by seeking to achieve or by paying to secure 'special insights' in order to outguess the market.

It was not the purpose of this paper to present a case for any specific disclosures or amendments to current accounting practices such as profit forecasts or price-level adjusted statements, but to develop a framework in which the decision to change the form or content of accounts might be taken without being inhibited by the kind of considerations engendered by the traditional shareholder-centred objective.

The Enterprise Value Concept of Asset Valuation

C. J. Warrell

From time to time there has appeared in the accounting literature some reference to the use of 'value to the owner' as an appropriate basis for the valuation of assets.[1] For the most part the writers concerned refer to Bonbright's treatise on Valuation of Property[2] as their primary source, and proffer his concept of 'value to the owner' as the best available approximation to the ideal of using discounted cash flows to arrive at the asset's present value. My basic purpose here is to explore this general concept in some detail, and in the process to

(i) point out that while Bonbright's conclusions on this matter are of great interest, they are not completely satisfactory for the purpose which some academic accountants are thrusting on them;
(ii) suggest the adoption of a related concept which we shall distinguish by the term 'enterprise value'; and
(iii) emphasise that, far from being a rough approximation to the ideal of discounted cash flows, the concept of enterprise value is completely compatible with, and in fact dependent on, a consideration of the expected cash flows of the enterprise.

Value of the Enterprise

When we consider the value of the enterprise itself there seems to be little disagreement about the theoretical ideal basis of valuation, even though measurement problems may prevent its use for report purposes. At this level of asset evaluation, i.e. that collection of liabilities and assets (both tangible and intangible) which constitutes the total enterprise, the appropriate figure is the expected future net receipts discounted by probability and interest factors to their present worth. However, to apply the same approach to an individual asset which is controlled by the enterprise (although a necessary calculation for managerial decision-making) is to confuse two qualities relating to the asset; the value to the enterprise of the mere possession of this particular item, and the value to the enterprise of the efficiency with which the asset is expected to be used (often in combination with other assets).

In order to emphasize this point, let us consider an efficient and growing enterprise where earnings are restricted by financial considerations and the rate of development of what we may call organisation efficiency, i.e. managerial efficiency, labour productivity, the bargaining power of the firm, the ability to raise finance, that most misused word 'goodwill', etc. Please note that we are not assuming perfect knowledge, so that it will be in order for us to suggest that as successful developments take place within this enterprise its value will increase with the consequent improved expectations. As additional managerial and financial resources become available for these developments (for our immediate purpose we shall assume the finance is in the form of long-term borrowing) and further assets are purchased, the value of the enterprise is likely to be increased, not because of some inherent value in the physical assets acquired, but because part of the latent earning capacity of the enterprise has been brought to light by the expansion process. If it is necessary to link this increase in enterprise value with a particular transaction, it would be more appropriate to use the raising of the additional finance, rather than the purchase of the assets, as the relevant event, but the real increase is not dependent on any transaction and in fact arose with the change in expectations which occurred when the expansion project was first decided upon.

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[1] e.g. David Solomons, 'Economic and Accounting Concepts of Cost and Value', in Morton Backer, Editor, *Modern Accounting Theory*, (Prentice-Hall Inc., Englewood Cliffs, N. J., 1966), and R. H. Parker and G. C. Harcourt, Editors, *Readings in the Concept and Measurement of Income*, (Cambridge University Press, 1969) in the Introduction.

[2] James C. Bonbright, *The Valuation of Property*, I, (McGraw-Hill Book Company, New York, 1937).

Value of Component Assets

If it is accepted that the value of the enterprise is the expected future net receipts discounted to their present value, and that it is often very difficult to relate these cash flows to individual physical assets, how are we to link the valuation of these separate assets to the valuation of the enterprise? It is submitted that if we wish to isolate the value of an asset from the mixture of cash flows through the enterprise, the most satisfactory approach is to be found in the use of marginal analysis in the following way. *The value of an asset to an enterprise is equal to the decrement in total enterprise value arising from the removal of that asset from the group.* This is much the same as Bonbright's definition of the value of an asset to its owner as 'the adverse value of the entire loss, direct and indirect, that the owner might expect to suffer if he were to be deprived of the asset',[3] although it would appear that Bonbright adopts a broader view of the indirect losses than I deem appropriate. Such a difference is hardly surprising when one remembers that Bonbright was concerned with the appraisal of property values for various legal purposes, and, in most of those legal situations in which 'value to the owner' would provide an appropriate basis of valuation, the loss of property is a *fact*, rather than the notional concept which is relevant for the valuation of an existing collection of assets. For our purposes the measurement of the decrement in enterprise value is *not* to be based on the asset's unexpected destruction or legal expropriation, but on a notional or foreseen removal which has no unexpected side effects and which could be remedied by immediate replacement if the owner so wished. For example, if we were to value a man's trousers we should consider the notional cost of replacing them under normal conditions with a pair which would afford him equal satisfaction, not the price he would be prepared to pay for cover if the trousers were to be ripped off him by a passing car in the middle of a busy city intersection.

The point may be made clearer by the use of a numerical example. An enterprise has a net present value to its proprietor of $96,000. The proprietor then revises his plans and expectations, borrows a further $6,000 on a long-term basis, and purchases Asset X for this amount. Because of the revision of expectations which occurred with the decision to purchase Asset X, the net present value of the enterprise to its proprietor is now, say, $100,000, an increase of $4,000. If Asset X were to be removed from the group of assets and liabilities which form the total enterprise, the decrement in enterprise value would normally be only $6,000, as for a further outlay of $6,000 we may revert to the position existing before the asset's removal. The decision to purchase Asset X led to an increase in enterprise value of $4,000 because of the ensuing change in the expected cash flows, but the removal of Asset X has no effect on this additional $4,000 valuation provided the asset may be replaced. If Asset X were not 'removed' from the group in the notional sense employed in this paper, but unexpectedly broke down so badly that it had to be replaced, it is most likely that the decrement in enterprise value would be far higher than the $6,000 required to replace it as there would be losses of normal profits and possible compensations due to customers arising from the delays in production. Bonbright's idea of deprivation suffered by the owner would naturally include such additional direct and indirect costs for purposes of calculating the actual loss suffered, but our objective is to value an asset which we still possess, and our concept of 'removal' of that asset from the group for valuation purposes is such that only those unavoidable costs associated with a planned replacement would be relevant. The removal of a replaceable asset will not affect the valuation of associated intangible assets which we have referred to as organisation efficiency, as this value from association may be transferred to an immediate replacement asset, and perhaps to subsequent replacement assets or even subsequent projects. We may summarise the sequence of events in our example in the following way –

Commencing value of enterprise		$96,000
Increase in value when decision to purchase Asset X was made		4,000
New enterprise value (before purchase of Asset X)		$100,000
Additional asset	$6,000	
Additional liability	6,000	—
Net enterprise value (after purchase of Asset X)		$100,000
Decrement in value of enterprise if Asset X is removed		6,000
Value of enterprise without Asset X (but with the opportunity to replace it)		$94,000

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[3] ibid. p. 71.

Decremental v Incremental Approach

Although it would be possible to approach the concept of enterprise value from an incremental rather than a decremental viewpoint, there exists the very real danger that complementary increases in the value of intangible assets may be confused with the value of the physical asset itself. Boehm-Bawerk expressed the position in the following way: 'A good which a man has he values according to the injury he would suffer by its loss; he values it, therefore, according to the last satisfaction which is assured him by having it. A good which a man has not he values, on the contrary, according to the increment in utility which its acquisition brings.'[4] He then suggests that we should get the same result by either method, which is, of course, quite true *provided* we make certain that it is the physical good which we are valuing. There must be no confusion between the value of that good and the value to the enterprise of the efficiency with which it is able to utilise that good, an efficiency value which we have suggested is often transferable to a replacement good and even to other goods and projects.

A fairly common example of the confusion of thought which exists in this area is to be found where it is suggested that a capital budgeting approach should be employed for the valuation of assets for report purposes. If we are weighing the relative advantages of purchasing Machine A or Machine B, we may quantify our expectations of cash flows from each of these machines and arrive at net present values which will provide us with a basis for making our decision. This is an entirely logical process, but we must remember that the values arrived at are not the values of the physical assets. We are able to make valid comparisons because we intend to apply the same collection of organisation skills and attributes to whichever asset we decide to purchase. For valuing Machine C which we already possess it is more convenient to think in terms of the marginal decrement in total enterprise value which would occur if the machine were to be removed from the existing collection of assets, rather than risk the possibility of confusion of tangible and intangible asset values which may occur if we think in terms of marginal *increment* in enterprise value following the addition of this particular asset to the group.

In our earlier example involving the purchase of Asset X the present value of the expected increased cash flows is $10,000, but for asset valuation purposes this amount should be segregated into the purchase price of $6,000 and the increase in organisation efficiency of $4,000. Once Asset X is purchased its value to the enterprise has an upper limit of the cost of replacing it, as the $4,000 increase in organisation efficiency is transferable.

Application of the Enterprise Value Concept

If we wish to apply this concept of asset valuation we must first decide how the decrement in total enterprise value is to be measured. The existing writings in this area use terms such as *net realizable value* and *replacement cost*, but they are ill-defined and used inconsistently. Accordingly, it will pay us to examine our reasoning and terminology very carefully, and it is to be hoped that the reader will avoid assigning unwarranted meanings to the terms to be employed.

Intentions of Management

For a start we must be clear exactly whose concept of decrement of value is involved. As there may be a number of opinions on how an enterprise should be operated and what use should be made of its assets, we are obliged to specify one source which will be used as our point of reference. This source we shall identify as the management of the enterprise, a management which is obliged to report to shareholders and other interested persons on the value of the assets to the enterprise. These values will be dependent on management's intentions with respect to the assets. It may well be that some of the 'shareholders and other interested persons' will disagree with these management intentions and accordingly disagree with the valuation which is reported. But as the reports constitute a report *by management* to shareholders and others, it is submitted that it must be management's intentions with respect to the assets which are used to determine the valuation basis. Let us assume for our present purpose a rational management which we shall define as one which has as its objective the long-run maximisation of the return to shareholders.[5]

The intention of a rational management (as defined) with respect to any particular asset which the enterprise already possesses will be determined by its estimate of two discounted cash flows.

The first of these is the discounted cash flow which would arise from the reinvestment of the net proceeds of the asset's realization.

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[4] Eugene Von Boehm-Bawerk, *The Positive Theory of Capital*, translated by William Smart, (Macmillan and Co., London, 1891), p. 154.

[5] The existence of other management objectives is not denied and is referred to later in this paper.

The second is the cash flow which would arise from the asset's use, again discounted by interest and probability factors to a present value.

Where the present value of the net cash flows arising from the reinvestment of the proceeds of the asset's sale exceeds that arising from the asset's use, then a rational management would sell the asset. If the reverse is true, then the asset's present value from use exceeds the present value of the reinvested proceeds of sale and we should expect a rational management to retain and use the asset. It is most important that we should note that a comparison of these two values would determine the *intention* of a rational management with respect to the asset, but it does not follow that we are provided with the value of the physical asset itself to the enterprise. For this purpose we must consider two other values which we shall refer to as the asset's replacement-based value and its realization-based value.

Replacement-based Value

The asset's replacement-based value is equal to the total opportunity cost to the firm of purchasing and installing equivalent productive capacity. The replacement need not be identical with the existing asset, but in estimating the asset's replacement-based value we must ensure that all unavoidable opportunity costs are included, and it is in this respect that the concept differs from the usual idea of replacement cost which is restricted to supply price plus installation charges.

Realization-based Value

As asset's realization-based value is the sale price of that asset less

(i) expected costs of selling the asset, and

(ii) any profit which has yet to be earned solely through sales effort.

Thus, for a production asset in which a firm does not trade and accordingly does not earn a profit through sales effort, the realization-based value would be equal to what is usually referred to as 'net realizable value', the sales price less costs of sale. However, to value a firm's finished goods inventory (up to optimum inventory level) we would deduct from the expected selling price the normal selling margin. This margin will cover both the costs of sale and the profit which has yet to be earned through sale. Note that it is only the *seller's* margin which should be deducted from the sale price and this does *not* always result in valuing the goods at 'cost'; for example, where

(i) there have been variations from the normal margin in additional mark-ups or mark-downs, or

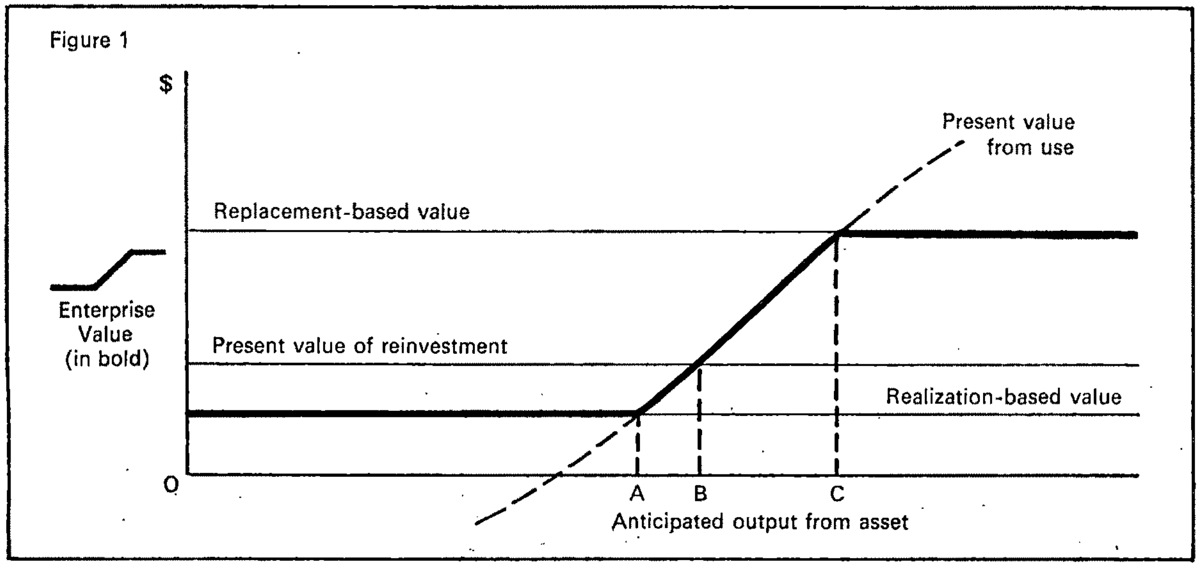
(ii) the goods are of our own manufacture so that sales price less *seller's* margin will leave a manufacturing profit as part of the goods' value.

Enterprise Value (Assumption 1)

We shall return to the question of inventory valuation later, but for the moment let us use Figure 1 to examine the relationships of the values we have been discussing. It will be noted that the graph is static: there is no time dimension. The horizontal axis depicts various possible levels of output which may be anticipated for the asset at any one moment of time.

The realization-based value, the present value of the reinvested proceeds of the asset's sale and the replacement-based value are all constants, independent of *our* expectations about the output we hope to gain from the asset. These values are all based on externally determined market prices (which may be

Figure 1



viewed as indicators of community-based expectations), and are not related to the efficiency with which we may use the asset. The present value from use is naturally dependent on the amount of service we expect to gain from the asset and accordingly is an upward sloping function intersecting the three other values at outputs which have been indicated as OA, OB and OC.

If the anticipated output from the asset does not exceed OA, the enterprise value of the asset will be its realization-based value, the minimum value which may logically be applied to that asset, as the decrement in enterprise value following the removal of that asset must at least be equal to its value based on sales proceeds. In the present example the enterprise also has another asset, an intangible, represented by the excess of the present value of reinvestment over the realization-based value. This excess arises from the expectation that it will be possible for the enterprise to utilize the proceeds of realization more profitably in some other project: whether this involves the acquisition of other assets or a reduction of liabilities is not relevant for our present purpose, but it is important that we do not confuse this intangible item with the value of the physical asset which we intend to sell.

If the enterprise output from the asset is expected to exceed OC, the enterprise value of the asset will be equal to the replacement-based value, as the decrement in total enterprise value if the asset were to be removed from the group must be limited to the total cost to the enterprise of replacing that asset. The question may be raised here: 'What if finance for the replacement of the asset is not available?' Again we must remember that we are considering a notional removal of the asset. For our present valuation purposes we are considering an *existing* collection of assets and we must not confuse the value of our ability to raise finance with the value of the physical asset. If our financial position is such that our ability to finance the replacement of a profitable asset is open to question, then this disability will apply to all our assets, and to attribute the whole earning capacity of the firm to any one of these (even though it is essential to the productive process) will lead to illogical results. The value of an asset to an enterprise is equal to the decrement in total enterprise value arising from the removal of that asset from the group – *not* from the inability of the firm to replace that asset if such a need should arise.

Between the outputs OA and OC enterprise value of the asset will be equal to its present value from use. Within this range up to an output of OB a rational management would still sell the asset and reinvest the proceeds, while between OB and OC the asset would be retained and used, but not with the intention of ultimate replacement.

Enterprise Value (Assumption 2)

Let us pause to review the assumptions which we made in Figure 1 regarding the relationships between the various values for an asset such as an item of plant. For an asset of this type it was assumed that the replacement-based value would exceed the realization-based value. Although this is what one would expect for an item of plant it need not always be so, and it would be quite misleading to assume such a relationship to be the norm for certain other assets. It is possible for the realization-based value to be equal to the replacement-based value of an asset, but it may never be greater provided we include *all* opportunity costs in our determination of the replacement figure. Replacement cost, if narrowly defined as the actual monetary outlay incurred in purchasing and installing an asset, may certainly be below the realization-based value. A common example where this relationship is to be found occurs with the finished goods of a firm's own manufacture. The 'costs of production' of such goods, measured on any of the possible orthodox accounting bases, would normally be below their realization-based value which, up to optimum inventory level,[6] will be equal to the aggregate of the selling prices of the goods less the mark-up which would normally be applied by a *seller* of such goods. Thus, if we have manufactured the goods, it will not be the mark-up which we have applied to our 'manufacturing costs' which will be relevant unless we have included in our 'costs' the profit which has been earned in the production of the goods and which must be distinguished from that to be earned in their sale. Consider two firms selling a product under similar conditions. One purchases the finished goods, the other manufactures them. The decrement in enterprise value occasioned by the removal of a unit of product from either organisation would normally be much the same, but we may arrive at such a figure for the manufacturer only if we are prepared to recognise some concept of manufacturing profit before the sale has taken place. Such a 'manufacturing profit' constitutes part of the total opportunity cost of the asset and is clearly part of the loss which would be sustained if the goods were to be removed from the collection of assets.

Another example of equality of realization- and replacement-based values is to be found where a firm retains for its own use an asset which is in short supply and could be sold without difficulty at a price above the normal replacement level. By electing to retain and use the asset the enterprise is incurring the opportunity cost of foregoing the profit, and the replacement-based value must include this cost as part of the total.

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[6] If the quantity of goods held exceeds the optimum inventory level, the realization-based value must be so calculated to allow for either the additional time or reduced prices required to dispose of the goods.

If we differentiate between replacement-based value and narrowly-defined replacement cost, we may illustrate these relationships as shown in Figure 2.

Conclusion

Let us examine the pattern of asset valuation which has emerged from our discussion.

(i) The minimum enterprise value of an asset will be equal to its realization-based value

(ii) The maximum enterprise value of an asset will be equal to its replacement-based value

(iii) Where the narrowly-defined replacement cost of an asset is below its realization-based value, the measurement of the enterprise value of that asset is achieved most simply by using the realization-based value which in those circumstances will be equal to the asset's replacement-based value.

We may summarise this pattern of asset valuation by adopting much the same procedure as used by Solomons[7] and Parker and Harcourt[8] in their discussions on value to the owner, but the reader should remember that their definitions of terms differ from those used in this paper.

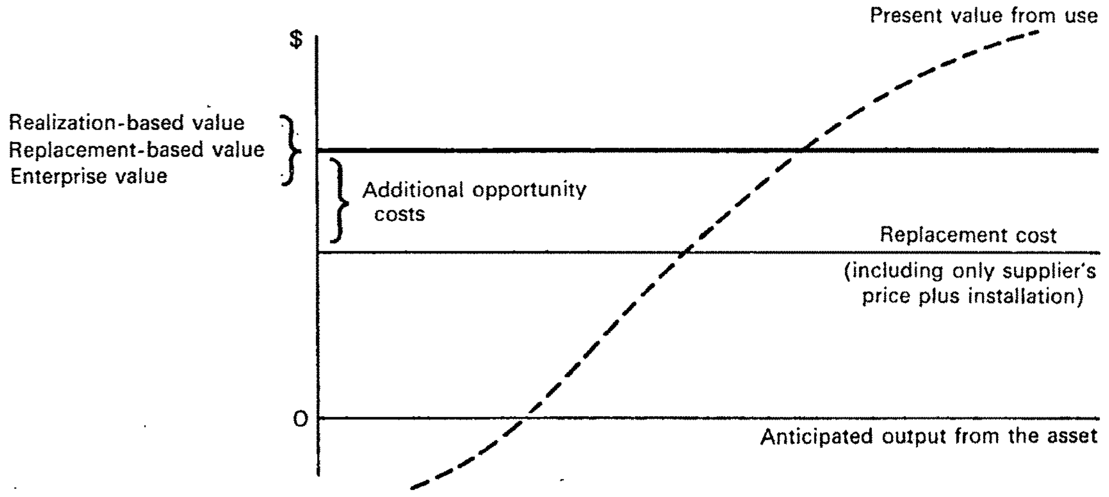
Let RPL = replacement-based value (the maximum possible value),
RLZ = realization-based value (the minimum possible value),
PV = present value from use,
EV = enterprise value.

Remembering that realization-based value may be equal to, but not greater than, replacement-based value, all possible relationships in Figures 1 and 2 may be represented as follows:

$RPL > RLZ > PV \quad \therefore\ EV = RLZ$
$RPL > PV > RLZ \quad \therefore\ EV = PV$
$PV > RPL > RLZ \quad \therefore\ EV = RPL$
$PV > RLZ = RPL \quad \therefore\ EV = RLZ = RPL$
$RLZ = RPL > PV \quad \therefore\ EV = RLZ = RPL$

Earlier in this paper we stated that the enterprise value of an asset is dependent upon management's intentions with respect to that asset. We then examined the determinants of a rational management's intentions with regard to the assets under its control. Let us now remove our assumption about the objective of a 'rational' management. If management is more concerned with maintaining a position of power than in maximising the return to shareholders, it may well continue to replace assets and remain in business when it would be more satisfactory for the shareholders if the company reduced its scale of operations or became an investment company. Should this change our argument about the use of enterprise value in accounting reports? I suggest to you that it makes no difference. While management intends to replace assets, the replacement-based value remains the appropriate basis of determining enterprise value. If the intention to replace the asset is 'irrational' in terms of our earlier definition, then the rate of return on this value will be low and should provide the users

Figure 2



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[7] op. cit. p. 125.

[8] op. cit. p. 17.

of the report with an indication of the weakness in management policy.

To what extent would the adoption of a concept of 'enterprise value' be in conflict with current practice? This issue is of more than mere incidental interest as I believe that the gap between current practice and the concept presented in this paper, while still dispiriting, is nowhere near the bottomless chasm which lies between current practice and the usual incremental approach to present values. Let us examine a few of the areas in which current practice tends to stick doggedly to its 'a-balance-sheet-is-not-a-valuation-statement' approach.

Current assets pose comparatively few problems until we reach inventory. Even here we already have the precedent to abandon 'cost' where 'market' is estimated to be lower, so that the only change required would be to adopt 'market' (appropriately defined) for *all* items of inventory. The main problem would arise with the suggested recognition of 'manufacturing profit' before the goods are sold. That such a profit properly belongs as part of the valuation of inventory is, to my mind, incontestable, and if we decide to exclude it on grounds of lack of objectivity in determining the appropriate figures, let us at least admit that the resulting figures are deficient in this respect. We should be prepared to draw attention to such defects in accounting reports, rather than invent rules which seek to impose the same defects on all reports, for while rules so devised may be applied uniformly, their effects will be far from uniform and comparability of data will be rendered difficult if not impossible. I should prefer that we have as our general goal the reporting of as true a valuation as possible, rather than that we all agree to be wrong together 'in accordance with generally accepted accounting principles'. These 'principles' when applied to inventory require a valuation at the lower of cost or net realizable value with an exception being made for long-term contract work in progress which is to be valued at cost plus attributable profit.[9] I suggest that what is currently viewed as the exception is far closer to the ideal valuation than the normal 'lower of cost or market' approach. Our emphasis should be reversed so that the goal of logical valuation is kept clearly in sight, and if it is decided that problems of objectivity and verifiability preclude our achieving a satisfactory valuation of some items, we should indicate this deficiency to the readers of the reports.

In the valuation of fixed assets there are already encouraging signs of moves away from strict adherence to the use of historical cost. The best known example is the Philips Company, but there are many other instances where total or partial recognition of the significance of current values has been made in the reports. What is possible for some companies must surely be capable of adoption by others? There will be problems, but we shall remain unable to solve these problems until we change our approach to valuation and introduce a more satisfactory basis than historical cost. I suggest that the enterprise value concept submitted in this paper represents a logical and attainable goal.

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[9] Statement of Standard Accounting Practice, *The Accountant*, May 18th, 1972, p. 654.

Bank Loans and Small Business Financing in Britain

R. E. V. Groves and R. Harrison

Introduction

The majority of small company owners see the bank manager as the only source of financial assistance[1] and the important role that the Joint Stock Banks play in the life of small enterprises has been recognised for a considerable time. The Macmillan report[2] in the thirties and, to a lesser degree, the post war Radcliffe report[3] identified the great difficulties smaller companies experienced when attempting to raise longer term finance in relatively small amounts. Macmillan believed this to be largely a result of a gap in the supply of suitable funds which were available to support smaller company growth and rationalisation. This notion became a celebrated feature and attracted comment in all subsequent small company financial studies.

Attempts have been made to improve the supply situation through internal changes in Joint Stock Banks and such institutions as ICFC.[4] This has led to some improvement but many problems remain. These can be grouped into two main areas, managerial and financial. The company can have an excellent product with a good future but may be constrained by managerial ignorance of the sources available to meet financial needs and the requirements that these sources demand. The financial group of problems is clearly identified in an ICFC study of their activities up to 1964.[5] It showed that smaller firms coming to them for longer term finance generally exhibited four main features:

(1) a higher average level of stocks and work in progress than larger companies,

(2) the important role for trade credit in company finance,

(3) a heavy reliance on bank credit, and

(4) a greater proportion of post tax profits retained in the business when compared with larger companies.

These features do not necessarily indicate poor management since they may be undertaken to maximise the internal contribution to company growth but, taken together, they make the enterprise a less attractive proposition to potential long term lenders. The smaller company, when it is in a growth stage, appears at risk both in management skills and financial structure.

Interest in small businesses is currently strong now that the Committee of Enquiry on Small Firms,[6] generally known as the Bolton Committee, has published the results of the various surveys conducted on its behalf.[7] The fourth Bolton report, directed by Dennis Lees for the Economists Advisory Group, is on financial facilities for small firms. The major objective of the study was to discover whether there was an institutional gap in the provision of financial facilities and information was collected from a number of interviews with financial institutions. The report concludes that although no Bolton 'gap' exists there are a set of difficulties which face a small company. Small companies were hit harder by credit restrictions and taxation, face higher investigation costs for loans, are generally less well informed on sources of finance and are less able to satisfy loan requirements.

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[1] Golby, C. W. and Johns, G., 'Attitude and Motivation', Committee of Inquiry on Small Firms, Report No. 7, London, HMSO, 1971.

[2] Report of the Committee on Finance and Industry 1931, HMSO, Cmnd 3897.

[3] Report of the Committee on the Working of the Monetary System, HMSO, Cmnd 827.

[4] The Industrial and Commercial Finance Corporation (ICFC) was incorporated in 1945 by the Bank of England and the London and Scottish Clearing Banks to provide capital to small and medium sized industrial and commercial businesses. Growth was rather slow during the first 15 years but now it offers a considerable range of services and in 1972/73 advanced approximately £40 million.

[5] Boswell, J. S., 'Small Firm Survey', ICFC, 1967.

[6] Report of the Committee of Inquiry on Small Firms, HMSO 1971, Cmnd. 4811.

[7] Ibid., Appendix III, p. 374.

The objective of this paper is to examine the concept of a gap by analysing financial information obtained from small companies. This should provide useful insights into the demand for, as well as supply of, finance in the smaller company sector. A point of specific interest will be the sources of funds for longer term finance. The relationship between the small company and its bank manager will require the paper to consider the role of the Joint Stock Banks. A secondary objective is to indicate whether any improvements can be made to facilitate effective interaction between supply and demand in the area of small company financing.

Research design

All empirical work suffers to some extent from data problems and Bolton, relying quite heavily on questionnaire designs, was no exception. Mr. M. Tamari writing in Bolton Report No 17 states:[8]

> '. . . many of the replies to the postal survey erroneously included loans from owners and directors under the heading of short term loans from banks, or in their liabilities to sundry creditors.'

The problem of such inaccuracies in recording, together with low response rates, bias and time constraints, compelled us to examine alternative sources of information and different methods of data collection. It was finally decided to use the information lodged at Companies House and to collect it through a random sample. Limited companies are legally required to file all relevant information about charges made on their property in respect of any secured borrowings at Companies House, London. Similarly, since 1967, all companies have to file sets of annual accounts as well as their annual returns. This data base does restrict the investigation to limited companies but since there are well over half a million registered live limited companies, this gives a large population to sample. There are problems of non-response with this data base which have been discussed elsewhere.[9] The filing inadequacies of Companies House are being overcome and when computerisation of the company records has been completed the major problems of non and late filing will be significantly reduced.

It was noticed that many companies providing information in 1967 for the first time included the comparative 1966 figures. The sample was therefore designed to exclude those companies registered after 1966 to maximise the potential financial information. In June 1971, a random sample of one hundred private companies, in existence prior to 1966, was taken from the Register of live limited companies at Companies House.

One hundred and eighteen companies were selected before the sample size of one hundred companies was reached. The eighteen discards comprised one public company (on the grounds of size), two companies dissolved prior to 1966 without informing Companies House and fifteen registered after 1966.

A problem with this type of data is that it is based on single estimates at one point in time and may have been contrived to present a particular picture to specific third parties, for example, creditors, bankers or the inland revenue. However, this data has been examined by the company's auditors and should be more accurate than data obtained from questionnaires. Moreover, if companies are disguising particular features it becomes more difficult to maintain the deception over time. The ability of the study to measure up to five years' consecutive figures made it likely that such deceptions would be identified.

Sample characteristics

The selected companies were first broken down into three groups: holding companies, subsidiary and single independent companies. This gave the following profile:

Holding	*Subsidiary*	*Single*
16	2	82

One of the companies went into receivership or liquidation in 1969. It was important to examine the sample for these companies since they obviously no longer require any financial assistance from external sources and might therefore introduce a bias into the results.

The sample was broken down into the size categories as shown in Table I. The company size is based upon the capital employed, defined as share capital, capital and revenue reserves, long term loans, loans from directors, provisions for future tax and minority interests.

Table I shows that the majority of companies under investigation are very small and this makes it different from the majority of other surveys.[10] An interesting point that emerges from an initial analysis of returns is the large proportion of companies who are technically insolvent since their liabilities exceed their assets. These companies are allowed to remain in this state although, on balance sheet evidence, creditors are only given partial cover on their debts. To summarise, the random sample produced a group of small companies dominated by those having a capital employed under £25,000 and who are totally independent.

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[8] The Research Unit, 'A Postal Questionnaire Survey: Non-financial data, Tables, Definitions and Notes', Committee of Inquiry on Small Firms, Report No. 17, London, HMSO 1971.

[9] Harrison, R. and Groves, R. E. V., 'Information Flows through Financial Analysis', International Journal of Physical Distribution. Journal series 1972/73, Vol. 3, No. 1.

TABLE I

Proportion of sample in size groups based on the company's capital employed

Capital Employed	*Percentage*
Negative	8
0–£10,000	55
£10,001–£25,000	19
£25,001–£50,000	5
£50,001–£100,000	6
£100,001–£250,000	3
£250,001–£500,000	2
£500,001–	2

TABLE II

Sources of Funds (%)

	1966	*1967*	*1968*	*1969*	*1970*
1. Share Capital (Equity)	14·1	13·1	14·8	14·0	17·4
2. Share Capital (Preferred)	1·0	0·4	0·4	0·5	0·7
3. Capital Reserves	11·1	5·9	6·3	7·6	6·2
4. Revenue Reserves	2·3	2·1	1·8	2·6	2·4
5. Retained Earnings	45·0	(17·7)	(0·5)	(7·3)	(21·0)
6. Directors' Loans	(82·6)	32·7	26·9	21·7	27·1
7. Deferred Tax	0	0·1	0·1	0·1	0·2
8. Long Term Debt	5·3	6·6	6·0	7·6	9·8
9. Bank Overdraft	9·1	16·4	8·5	13·3	16·0
10. Future Taxation	3·2	4·4	2·7	1·9	1·5
11. Short Term Debt	46·6	2·8	1·9	5·2	6·0
12. Creditors	30·6	25·1	21·4	20·7	22·1
13. Dividends Payable	2·0	0·4	0·7	0·5	0·3
14. Hire Purchase Debt	0·6	0·8	1·8	0·7	0·8
15. Intra Group Balances	11·7	6·9	7·2	10·9	10·5
	100·0	100·0	100·0	100·0	100·0
Number of Reporting Companies	47	76	85	79	62

The figures in parentheses indicate negative values.

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[10] All other published work has been with samples of companies with capital employed greater than ours. For example, see Bates, J., 'The Financing of Small Business', Sweet and Maxwell, London, 1st edition; the two latest ICFC small firm surveys by C. Allen and R. C. Osborn; Bolton Committee Research Report No. 17, by Tamari; and Samuels' and Chesher's work, 'Growth, Survival and the Size of Companies 1960/69', published in 'Market Structure and Corporate Behaviour', ed. K. Cowling, Gray-Mills, 1972.

Research results

An analysis of the sources of funds utilised by the companies in our sample was an important aspect of the study. The breakdown is shown for each year as a percentage of the total assets in Table II and the number of respondents is given at the foot of each column.

This comprehensive table was summarised into five groupings of Equity, Long Term Debt, Taxation, Current Debt and Intra Group Financing. Directors' Loans are treated as equity because they appear to be manipulated from year to year and an investigation of the annual list of shareholders for each of the companies revealed that in almost all cases the directors are also the owners. The importance of directors loans in small firm funding has been confirmed in a recent ICFC survey.[11] In this study bank overdraft is treated as short term debt.

These tables show a number of interesting points of which three are of particular importance. The first is the size of the financing provided by the short term lenders, namely the banks and general trade creditors. The second is the switch from using retained earnings as a source of funds to the use of Directors' Loans. The 47 per cent response rate in 1966 was regarded as being rather low and so a further investigation of individual company records was made which supported the interpretation of a switch. This is almost certainly due to changes in the taxation laws which made it prudent for small companies to pay out their profits as remuneration to directors rather than dividends or retained earnings. The third point is the relative size of the borrowing from banks on overdraft.

A breakdown of the sources of external secured loans made during the period 1960 to 1970 is given in Table IV. Every new charge placed on company's assets is interpreted as a new loan because it indicates that a company's need for additional funds has been met by an external source requiring security. The nature of the data does not make it easy to differentiate new unsecured borrowings but Table V gives a breakdown of the loans from banks by size and also by average values for unsecured loans.

TABLE IV

Sources of new secured loans during 1960–1970

Commercial Banks	
British	36
Overseas	3
Finance Houses and Merchant Banks	8
Insurance Companies	2
Building Societies	2
Private Individuals, etc.	13
	64

Tables IV and V show that not only are banks the predominant source of external funds but that the majority of loans are under £10,000. Table IV also shows that 20 per cent of the secured loans come from private individuals, a source identified in previous studies but not measured in this way. The information in these tables does not contribute greatly in identifying a gap in the supply of finance. There are not many loans in the Macmillan gap range but the asset structure of the majority of companies in our sample would not warrant loans of this magnitude. The evidence of these tables alone supports Bolton's recommendations. An interesting point is that there are approximately three times as many unsecured as secured bank loans. The relative insecurity of small firms makes the figure rather

TABLE III

Summary of Sources of Funds

	1966	*1967*	*1968*	*1969*	*1970*
Equity	(9·1)	36·4	49·8	39·2	32·9
Long Term Debt	5·3	6·6	6·0	7·6	9·8
Taxation	3·2	4·5	2·8	2·0	1·6
Intra Group	11·7	6·9	7·2	10·9	10·5
Current Debt	88·9	45·6	34·2	40·3	45·2

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[11] Osborn, R. C., 'ICFC Financing small and medium sized businesses', ICFC 1972.

TABLE V
Distribution of overdrafts 1966–1970

Size of overdraft	*1966*	*1967*	*1968*	*1969*	*1970*
0 – 999	(3)	(2)	(6)	(9)	(3)
1,000 – 1,999		1(4)	1(5)	1(3)	1(1)
2,000 – 2,999	1	(3)	(3)	(3)	(2)
3,000 – 4,999	1(1)	1(5)	3(6)	(3)	1(3)
5,000 – 9,999	(1)	1(1)	(2)	(3)	1(4)
10,000 – 19,999	2		(1)	(1)	(1)
20,000 – 49,999	1	2	1	1(1)	
50,000 – 99,999			1	1	
100,000 –	(2)	2	1(1)	1	1
	5(7)	7(15)	7(24)	7(23)	4(14)
Number of companies with property charged but without a loan outstanding	2	7	6	3	2
Median					
– secured overdraft	£14,940	£32,933	£3,683	£5,419	£6,378
– unsecured overdraft	£3,299	£2,298	£2,690	£1,904	£3,260

The figures for unsecured loans are in parentheses

remarkable. It is not possible to check that some form of security has not been taken out on the personal assets of a director from Companies House information. Additionally the individual loans are not large and therefore may not constitute a very large proportion of the bank loan portfolio. Information that would be useful to planners is the quantity of unused debt capacity a company possesses and the amount of assets presently committed but not utilised. Table V shows that in 1967 seven companies had property still charged by a bank even though they did not have a bank loan. The fact that this figure falls to only two companies in 1970 could be indicative of the impact of credit restrictions operated by the Bank of England.

The method of registering the charge at Companies House made it impossible to ascertain either the historical cost of the assets charged or the market value of the security given as a charge. The evidence cannot therefore be used to show whether banks and other lenders oversecure their loans or whether there are any other assets available for charge. It is also difficult to envisage how such information could be collected since the companies themselves would be unlikely to co-operate unless one was actually in the process of lending them a sum of money. The fact that a proportion of sampled companies still have some of their assets secured could be evidence that they are using the overdraft facility as a line of credit and only drawing upon it when necessary but keeping the assets secured so as to minimise clerical time. Alternatively it might be viewed as evidence of inefficient management who have not bothered to notify Companies House that the loan has been repaid in full.

To pursue the line of credit approach and to examine the role of bank overdrafts an analysis of charges was made for the period 1960 to 1970. The results are given in Table VI. Figures in parentheses show the bank loans and the other figures represent the total loans from third parties secured on the companies' assets. In 1965, therefore, a total of twelve secured loans were taken out by the sample and six of these were repaid before the end of 1970. Four of the six secured loans taken out from banks in 1965 were still outstanding at the end of 1970. The large number of bank overdrafts still outstanding at the end of 1970 is very interesting and when this is

TABLE VI
Analysis of Charges 1960–1970

Year Charge taken out	*Charges still Outstanding at 31.12.70*	*Charge Satisfied by 31.12.70*	*Total charges taken out in this year*	*Percentage of Total Charge taken but still outstanding at 31.12.70*
Pre 1960	4(2)	6(2)	10(4)	40%(50%)
1960	1(1)	1(1)	2(2)	50%(50%)
1961	2(1)	2*(2*)	4(3)	50%(33%)
1962	3(2)	0(0)	3(2)	100%(100%)
1963	4(3)	0(0)	4(3)	100%(100%)
1964	4(4)	1(0)	5(4)	80%(100%)
1965	6(4)	6(2)	12(6)	50%(67%)
1966	4(2)	2(1)	6(3)	67%(67%)
1967	3(2)	4(3)	7(5)	43%(40%)
1968	4(3)	2(0)	6(3)	67%(100%)
1969	2(1)	0(0)	2(1)	100%(100%)
1970	2(2)	1(1)	3(3)	67%(67%)
	39(27)	25(12)	64(39)	

*1 loan satisfied but date of full satisfaction unknown except that it was prior to 31.12.70.

combined with evidence from other tables, a fairly strong case can be made that overdrafts are being used as long term finance.

In each year studied at least 40 per cent of the secured loans taken out were still outstanding at the end of the period. The secured bank loans percentage only dropped below the overall percentage on two occasions, whilst in five years' figures all the secured bank loans were still outstanding by 1970. The air of permanency is further confirmed by examining the type of security specified. Table VII gives a breakdown for both bank and total secured loans.

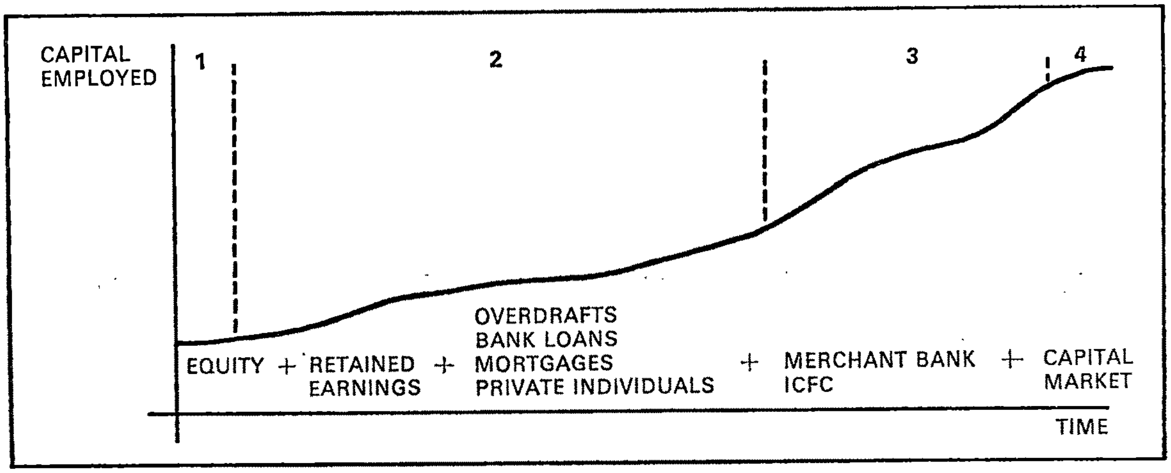
TABLE VII
Types of charges 1960–1970

Charge	*Overall*	*Banks*
Floating	9(14%)	5(13%)
Fixed	55(86%)	34(87%)
	64	39

All types of lender prefer the fixed type of charge and there are good reasons for this. A fixed charge is easier to control, to administer, to value, to realise should the need arise, and to monitor when providing against fraud.

Conclusions

The method of data collection adopted by the study provided useful insights into the problems small companies face in the management of finance. It once again shows the important role that banks play in the life of these companies and also quantifies the support in a different manner to previous studies. It does not totally resolve the difficulties surrounding the 'gap' hypothesis. The Institutions and Bolton claim that there is no gap in the supply of finance and their case looks very strong. Small companies do, however, face a set of difficulties peculiar to their group which makes it more troublesome and expensive to obtain longer term finance. This study provides strong evidence of a switch in the use of overdrafts to one of a much longer term role than is normally associated with this type of finance. To explain such inconsisten-


CAPITAL EMPLOYED
1
2
3
4
EQUITY + RETAINED EARNINGS + OVERDRAFTS BANK LOANS MORTGAGES PRIVATE INDIVIDUALS + MERCHANT BANK ICFC + CAPITAL MARKET
TIME

cies, therefore, it seems sensible to examine the problem by observing not only supply facilities and demand requirements but also how the two match.

The demand requirements of a company, with the major sources and their growth over time may be represented by the above figure.

There are four distinct phases. Initially owners' capital is the dominant source, rapidly replaced by the Joint Stock Banks. When the company is sufficiently strong, successful, and well managed, Merchant Banks or ICFC take over the role of funding and finally the company may be floated on the capital market. The phase dominated by the banks is the longest and also the period when companies are most vulnerable. The banks are usually seen as playing an important role in the operation of the small company but it can be seen that they play an equally vital part in the development and growth of small companies. The banks should therefore ensure that the services offered meet both the control and strategic requirements of these companies.

The sample examined financial information from a large population of very small companies and these lie in the second phase of growth. If these companies have growth objectives which will bring them into contact with institutions like ICFC and Merchant Banks in the future, banks can play a vital role in giving effective financial advice in the management and planning of the enterprise. They are in a perfect position to offer this service. They have a good image with the small businessman, are located throughout Britain, have an existing link with the sector and have access to a comprehensive range of services. It would seem that the inability to market these services and exploit their position more effectively is contributing to the financial difficulties facing small companies.

The banks could start by carrying out a comprehensive survey of the financial requirements and difficulties facing their existing companies. This survey would enable them to develop an appropriate package of services and to present them to the small businessman in the most effective way. The bank managers themselves might be seen as the best people to administer the package and this would require changes in the management development structure to ensure that they possess the appropriate diagnostic skills. Alternatively, it might be more effective to create a new position, small business adviser for example, in each of the geographic regions. The bank manager would then put the businessman into contact with the specialist when financial advice or long term financing was sought. The link Joint Stock Banks have with some Merchant Banks might also be an appropriate area to develop a package of small company services. Bolton[12] found that small firms 'have a lamentable ignorance of the sources available to meet financial needs' and also that 'better facilities for term loans, factoring and credit insurance would help many of these firms'. If the banks are willing to play a more positive role in small company development, it will ease the considerable burden that these firms face in the area of finance.

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[12] Op. Cit.

Illusory Holding Gains on Long-Term Debt

John R. Perrin

This paper seeks to pick up the thread of reasoning from the point where Professor R. S. Gynther concludes his case[1] for arguing that to treat notional gain from holding long-term debt during inflation as an upward adjustment to profits is a major conceptual error. Only this one aspect of Professor Gynther's paper is being considered here in detail, because the present writer finds himself in almost total agreement with the balance of that paper.

The aspect in question is of topical importance insofar as two documents issued by the Institute of Chartered Accountants in England and Wales ('Exposure Draft 8' and 'Provisional Statement of Standard Accounting Practice No. 7') have advocated that supplementary accounting statements should be published on a 'Consumer Purchasing Power' (CPP) basis of adjustment for inflation, inclusive of taking into account for inflation-adjusted profits any notional holding gain arising from the devaluation of loan capital outstanding.[2]

Professor Gynther, and others, have already shown that the notional gain from holding loan capital is not wisely classifiable as an addition to profits in inflation-adjusted accounts, because it is uncertain, unrealised, and not available for distribution at any interim point in time. In this brief paper I shall attempt to show additionally that in the general case such holding gains are often illusory and *never* likely to be fully realised or capable of distribution. If this is correct, then the proposed CPP treatment of such holding gains is not just imprudent. Instead, it is seriously misleading.

In Professor Gynther's Appendix 1, he developed his argument around an example presumably chosen both for simplicity and for dramatic impact . . . but it is an example quite atypical for the mainstream case of accounting for manufacturing industry. Firstly, a business entirely devoted to renting land to farmers is highly individualistic, perhaps especially in Britain, because of land shortage, inflation hedging, tax hedging, outright speculation, ownership status-value factors, and various legal restrictions that characterise the markets both for the purchase and the renting of agricultural land. Secondly, the assumption of 100% p.a. inflation is unrealistic . . . as the author of course recognised. Thirdly, the assumption that 'the prices of all commodities and services' increased simultaneously at the same rate is grossly misleading . . . if this could be so, then Gynther might have little legitimate grievance against CPP accounting! Specifically, it would in practice be most improbable in the farm example cited for existing rents to increase simultaneously with land values, and in the more general case of manufacturing industry one would of course expect to see costs lurching upwards, with resale prices jumping forwards intermittently, alternating between lag and lead positions relative to costs (the familiar 'tortoise and the hare' situation). Fourthly, few industries in Britain would operate on a gearing ratio as high as 50% (although farm-land ownership and renting doubtless might be one of the exceptions).

I shall not attempt to construct an alternative numerical illustration more realistic than Gynther's, because in the real world there are so many variations of inflation effects, gearing, capital turnover, resale-market pricing patterns, etc., as to make any particular illustration arbitrary and to some degree atypical. Therefore, whilst noting its limitations, let us stick with Gynther's illustration, examine his conclusions and attempt to carry the general argument further.

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[1] In his paper, 'Why Use General Purchasing Power?', *Accounting and Business Research*, Spring 1974. The case is developed in detail in Appendix 1 of the paper.

[2] See Notes 2 and 3, Appendix 2, of PSSAP – 7, for an illustration of the type of profit adjustment envisaged.

Professor Gynther explains (p. 155) that, in the context of his illustration where shareholders' profits increase from $15 to $35 as a result of inflation (and where $5 of the increase is directly attributable to the lower real cost of servicing long-term debt), 'all else being equal, the stock exchange prices of their shares will more than double'. This explanation is strictly true for the specific assumptions of Gynther's illustration . . . but the illustration has been shown to be atypical. The more than doubling of profits and share prices depends upon the *rate* of increase in the company's prices (rents, in the illustration) keeping in step with the rate of inflation in the company's costs. In general this does not happen in contemporary Britain. Indices of real labour cost (i.e., adjusted for productivity), material costs, and capital-goods costs, typically show a greater rate of increase than resale or retail price indices. Why so? Firstly, the pressure of resale competition, including import competition in many markets, reduces and delays resale price increases. Secondly, governmental and social pressures reduce and delay price rises. Thirdly, I suggest that the cheapened cost of servicing debt capital under inflation has in fact been reflected in a lower rate of resale price increases, rather than in any substantial enhancement of company profits for the realisable benefit of shareholders. Let us examine this third factor in more detail.

It is generally agreed that by strict economic criteria most markets are imperfect in some degree. Nevertheless, and especially in manufacturing where import-export competition arises, there is a frequent possibility of substitutes, and overall competitive pressures are severe. Manufacturers raise prices as and where they can and must. What are their criteria? Presumably 'cost plus a fair margin' and 'target pricing for an acceptable return on capital' are closely intertwined with 'what the market will bear' . . . the two approaches interacting towards some temporary (because of inflation, etc.) equilibrium in each separate market. Now how, for example, is capital budgeting carried out for decisions on new investment, new products, product mix, and pricing? The criteria and methods of capital appraisal and decision-making in the real world are legion, but a fair proportion of larger firms presumably do not depart too far from the academic models. The commonest academic model tells us that capital projects should be tested by a weighted-average cost-of-capital cut-off or discount rate that falls as gearing increases to the optimal debt-equity mix. The variety of treatments for inflation in capital budgeting is great, and too often in practice inflation may be denied explicit recognition. Nevertheless, it appears probable that business investment decision-making does not in general assume that gains from gearing will *increase* equity returns, but rather that they will *reduce* the minimum acceptable rate of return required. Where target pricing is employed, this will lead, derivatively, to prices related to the average cost of overall capital employed, and it will not be based on some concept of premium earnings on debt capital for the benefit of equity capital. Presumably this pricing situation arises not because companies and investors would reject equity earnings enhanced by gain on the use of cheap debt capital. Rather, it must be that business decision makers realise that capital is highly mobile and that rates of return on capital tend towards equilibrium levels for given degrees of risk. So therefore, given that a firm's gearing level is not so high as to significantly increase risk or be critically different from the gearing of other firms with which it must compete, the management of the firm must price so as to try to earn at least the prevailing equilibrium level of profits on overall capital, where gearing and inflation may combine to lower cost of capital and therefore also lower the equilibrium level of profits and competitive prices. In short, normal commercial practice in competitive markets competes away the notional gain from holding long-term debt (at least up to the level of gain represented by the *average gearing* in the industrial sector or risk class concerned).

If Professor Gynther's illustration correctly reflected the normal effect on profits of the use of gearing during inflation . . . i.e., real profits and real profitability increasing at a higher rate than the rate of inflation . . . then we would expect to see on the historical record, *ceteris paribus*, that company profits behaved in this way over prolonged periods of inflation. Whilst other things obviously do not remain 'equal' in the environment, the historical record certainly lends no credence to the view that equity shareholders have actually experienced any real (inflation-adjusted) increase in profitability as a result of the use of debt capital during recent inflationary periods.[3] Perhaps all that one can add is the supposition that, had gearing not been used, and used increasingly, the return to equity in recent years might even have been lower than has been recorded.

To summarise, I have attempted to show that the benefit of holding loan capital or other long-term debt under conditions of inflation, may be treated consciously or unconsciously by management as a cost saving (rather than a profit gain), and that as with any other cost saving, this may be considered as a negotiable margin which ideally should be added to profits, but which in practice will frequently have to be conceded away *via* lower rates of price-increase, in order to meet competition or to respond to governmental pressure or regulation . . . especially where this form of cost-saving benefit is widely available on equal terms to all the competitors. Perhaps an analogy would assist in emphasising this point.

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[3] 'The Profits of British Industry' by G. J. Burgess and A. J. Webb, in *Lloyds Bank Review*, April 1974, may be consulted for evidence and sources confirming the fall of profits on total capital in British firms, during the post-war period. See also 'Return on Equities and Fixed Interest Securities: 1919–66' by A. J. Merrett and A. Sykes, *District Bank Review* No. 158, 1966, for information on the fall of profits on the equity over an extended period of years.

Suppose that a company were able to negotiate a long-term contract for the supply of materials at a fixed price, and that subsequently a period of substantial inflation occurred, and the contract was honoured and utilised (n.b., loan capital itself is no more than a long-term contract to supply the use of money at fixed interest and for a fixed principal on repayment). Now what would be the effect of the long-term contract on the company's profits during the period of inflation? In practice the answer would almost certainly depend (in the absence of a collusive or price-regulated market) on the circumstances and behaviour of competitors. Firstly, if our company were the only firm to have the advantage of the contract for fixed-price supply, resale prices in the market would probably rise substantially in due course, and our firm would increase its profits by more-or-less the difference between its fixed supply price and the prevailing open market supply price. It would realise its assessable holding gain on the contract. Secondly, suppose instead that all major competitors similarly had negotiated fixed-price supply contracts: resale market prices would probably turn out to be lower than in the first case, because of competition, so that little or no realised gain from holding the contract would arise. Thirdly, suppose at the other extreme, that our company was the only major competitor *not* to hold a fixed-price supply contract: resale prices once again would be relatively lower, but our company's supply prices having risen, its profits would fall. This example suggests a general principle that holding gains, and anticipations or capitalisations of future profits (cost-saving gains), cannot safely be calculated for the company as a closed-system. Instead they must be judged and calculated, if at all, in the context of the company as but one part of a larger market-system.

It should follow from the foregoing three-part analogy that whether or not a company acquires and can realise a holding gain from its long-term debt capital during prolonged periods of inflation will depend, unless market competition is unusually imperfect, upon its *relative* degree of capital gearing compared to competitors. Any excess of gearing over the average of competitors (and assuming the gearing level has not shifted the company into a higher-risk class of investment) might represent the basis of a realisable holding gain on *only* the amount of the excess gearing. Similarly, any shortfall of gearing compared to competitors might provide the basis for a measurable and realisable 'holding loss' on the shortfall of gearing. However, judgments of 'excess' and 'shortfall' might be thought subjective, given reasonable argument over 'who are the relevant competitors?' Moreover, in many market sectors the level of gearing will not in practice vary all that significantly among the competitors. It therefore follows as a practical matter, that for published accounts there may be no substantial justification for reporting either holding gains or holding losses on loan capital, except only in truly extreme cases.

This brings us full circle back to Professor Gynther's main theme. CPP accounting may have some merits of simplicity and apparent objectivity. But a cumulative historical rate of inflation is clearly not an acceptable criterion for measuring the profit, if any, on holding long-term debt. Nor is it much if any better for measuring the true economic understatement of the depreciation of heterogeneous bundles of fixed assets during inflation. A single general index of prices, and especially such an index based on retail prices rather than on industrial or wholesale prices, can only be reasonably accurate when applied to *short-term* monetary items and possibly stocks. Any distortions from reality in a particular year are likely to be even further distorted as and when up to five or ten prior years' profits are retrospectively adjusted by CPP indices. Whilst CPP accounting represents a conceptual advance on historical cost bases for accounting, it is arguable that CPP-adjusted accounts are so imprecise a guide to the present (and future) performance of individual companies as to offer but limited value in the hands of investors and other financial decision makers. If this is correct, then one can only urge that the next stage of conceptual advance in accounting measurement should be sought without delay.

Book Reviews

Human Asset Accounting *W. J. Giles and D. Robinson* (Institute of Personnel Management and Institute of Cost and Management Accountants) – 30 pp. 75p

This book by Giles and Robinson is one which every accountant should read, but whose content and methodology are not immune from criticism. Clearly the topic is central to the current concern both here and in the USA with 'socio-economic accounting': while it is comparatively easy to have a lot of fun with the approach used by the authors, this exercise does require one to think about the nature of methodology in the social sciences in general – and perhaps to reflect that it is not so easy to suggest something that is really better.

It is unlikely that anyone would disagree (at a level of general platitude) with the proposition that 'people are important to our company'; nor perhaps with the reflection that it is their skill, loyalty and motivation which makes them so. Possibly one might feel entitled to feel more sceptical of some of the work done by behavioural scientists on how these qualities grow and interact but by and large it would be correct to suppose that their difficulties and controversies proceed more from imprecision in defining their terms than anything else. In addition to the items cited by Giles and Robinson, interested readers might like to be referred to the American Accounting Association's 'Report of the Committee on Human Resource Accounting' in the Supplement to Volume XLVIII of *Accounting Review* (1973, pp. 169–185); this contains a bibliography which is said to be 'not inclusive', but nevertheless contains 101 titles.

However, after a summary of this material, the authors advocate a method for evaluating 'human capital'. Briefly, this consists of finding a 'human asset multiplier', which is a constant factor (which varies for different companies and different grades of employee within them) which converts the annual wage-bill (or maybe wages-plus-expenses) into a sum which the management agree to be a fair measure of what they believe to be the proportion of the 'goodwill' of the enterprise represented by the work-force. Leaving aside the question of how goodwill should be measured in the first place, or what grounds one might have for appropriating some part of it to the work-force, one can see that their proposal is an exercise in 'statistical inference'. How could it be justified? Econometricians are often accused of 'fiddling about' with parameters until they get some which, by happy chance, provide a reasonable fit between the dependent variables in their equations and the independent ones; their defence is that *before they start* they form a logically justifiable 'structural equation' based on some hypothesis. Using some specific technique for regressing their variables they arrive at parameters and then apply standard statistical tests to establish the adequacy of the fit. If the fit isn't very good, they then construct another hypothesis, rather than fiddle the parameters (at least in theory).

Giles and Robinson do not enlighten their readers very much over these matters of estimation and hypothesis testing; the variables in their equation seem to change from example to example, with the only constant factor being that the multipliers to be applied are in all cases linear. There is no suggestion that a series of similar calculations is to be made, so that one could see whether these equations and multipliers could arrive at reasonable 'human asset values' for, say, 40 or 50 firms in the same industry, or chart the changes in that human asset value for the same firm over a period of years. In fact, the test suggested by the authors is to multiply the profits after tax of the company in question by the p/e ratio of 'a broadly similar company from the *Financial Times* lists', deduct the net assets as per the balance sheet and compare the calculated human asset value with, say, 90% of the balance.

This, then, is the real value of the growing body of material on human asset accounting – it is the first recognition by accountants that they are trying to describe the state of a system. Since the systems are multivalued and dynamic, and the traditional approach of the accountant is single-valued and three-dimensional (which is to say, seeing the basic module as a transaction comprising a debit, a credit and a single point in time), some revolutionary changes in concept will be required before success will be achieved. What is more natural to an accountant than to suppose that if something is clearly an asset, it must have a 'value', whose increments or decrements represent its contributions to income? Unfortunately, transactions are not three-dimensional or single-valued and commonly affect a variety of accounts, recorded in many values over many periods of time. The payment of wages not only involves the exchange of services for cash in some one week, but builds up (or destroys) a reservoir of skill, loyalty, motivation, which will affect profitability and social stability over a long period of time. This is what accountants will have to find a way of recording, before human asset accounting or any other aspect of socio-economic accounting becomes a practical proposition.

Trevor Gambling

Financial Planning in Divisional Companies
Cyril Tomkins Accountancy Age Books, hardback £4, paperback £2.

Divisionalised companies have been with us for more than half a century, but only relatively recently have academics taken seriously to diagnosing the rationale of the multidivisional organisation and to prescribing for its peculiar problems. Diagnosis influences prescription. Mr. Tomkins considers that 'the essence of divisional control is to permit divisions as much independence as possible and yet ensure that the actions of each division are co-ordinated and directed towards the achievement of overall ... company objectives'. This suggestion of independence as the goal of divisionalisation, which guides the later examination of techniques, differs in emphasis from rationalisations in the past decade which have seen divisionalisation as a device to allow central management to concentrate on strategic/entrepreneurial activities – with devolution of tactical/operational activities on to divisional management providing a degree of independence as a means, not an end.

After a review of the advantages and problems of divisionalisation the book deals with appraisal measures, transfer pricing and investment decisions proceeding progressively through techniques which provide greater independence for divisions. The last chapter examines company practices in the UK and USA. Working capital co-ordination gets scant consideration.

The treatment of appraisal measures is the least successful feature of the book. The author disclaims any deep consideration of performance evaluation of divisional managers, justifiably in view of the book's emphasis on financial planning, but *ex post* evaluation procedures are considered for assessing 'the contribution which a division can make towards the overall corporate objective'. A Demski-type analysis based on an *ex post* optimum is envisaged, apparently for the principal purpose of replanning; just how the author's global profit variances would be used for this purpose is not evident.

On the choice of income concepts, a short-run income measure is developed and 'recommended for practical use'; this is given by sales minus total costs and interest on working capital. In this measure the specification of total costs could be clearer, but a deduction for that part of depreciation which is variable with output is considered and rejected on the grounds of subjectivity. A couple of pages later the author turns to the residual income controversy. He argues that 'interest on divisional capital is a fixed expense [in the short run] and ... irrelevant for determining the optimal output level' and with an extraordinary *non sequitur* concludes: 'residual income is the correct measure for use in evaluating operating decisions'. Why it should be considered necessary to make an irrelevant deduction is not explained, nor is the fact that depreciation (however measured) is now back in the act. In the course of this argument Amey's criticisms of residual income are rejected on the grounds that they would involve exclusion of interest costs of working capital; in fact Amey's criticisms were directed against the use of an imputed charge on divisional investment for the company's long-run cost of capital (expected future earnings yield for an all-equity firm), not against recognition of variable costs of working capital. Later, in chapter 5, residual income is revisited, this time as a tool for project selection. Given appropriate *ex ante* depreciation assumptions, residual income is examined as an elaborate way of reaching the same decisions as net present value; understandably the more direct approach is preferred.

The chapters on transfer pricing provide a valuable synthesis. Chapter 6 gives a useful, although condensed, survey of 'complicating factors' in investment decisions. Problems of capital constraints are introduced, the relevant discount rate is examined with admirable succinctness, and uncertainty is briefly considered. Chapter 7 proceeds to the possibilities for divisionalising investment decisions. A preliminary suggestion is made that, given capital rationing, divisions might pay £1 for every £1 of finance taken up; this suggestion is not developed to the extent of clarifying what the divisions would be paying with. Possible decomposition approaches, interdivisional effects, and divisional risk-taking attitudes are then discussed. The conclusion is a mild understatement that there are likely to be considerable problems in reconciling divisional investment autonomy with corporate goals.

The final chapter reports on a valuable survey of divisional practices in 65 UK companies. The results are reviewed and compared with earlier US studies. There is a wealth of information in this chapter, but little to support a view of independence as the *raison d'être* of divisionalisation.

This is an interesting book, despite some lapses. It would be suitable for a readership with background knowledge in divisional income measurement, linear programming and capital budgeting, and it could provide a useful supplement to the diet of final year undergraduates – since it stimulates controversy in some places and synthesises the literature in others. The book is also intended for the qualified accountant; if he reads it he will find that it provides a carefully referenced selection of models related to problems of the divisionalised firm.

Don Egginton

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A Comparative Study of the Accounts of Seven Major Oil Companies

Kenneth S. Most

The fact that oil companies use different accounting principles and methods to account for apparently similar operations has been extensively discussed in recent years. This was one of the factors responsible for Accounting Research Study No. 11 (The Field Report), which was intended, at the time, to lay the groundwork for a pronouncement of the Accounting Principles Board on this subject.[1] The committee on Extractive Industries of the Accounting Principles Board published a report in 1973, entitled *Accounting and Reporting Practices in the Oil and Gas Industry*, which gave the history of APB involvement in this problem and drew attention to one particular aspect of it, the 'full-cost' versus 'successful efforts' controversy. The report stated that 'All attempts by the Committee to find the one theoretically best method of accounting in the oil and gas industry met with vehement resistance from either one or both of the factions supporting the alternative methods of accounting. The results of the aborted attempts to find one method of accounting also make it clear that the major issue is whether or not the two basic methods of accounting for the oil and gas industry should be allowed as equally acceptable alternatives'.

The intention of the APB was to narrow the range of alternative accounting practices within the industry, presumably to improve the suitability of oil companies' financial statements for financial analysis. This point has also been the subject of several comments in the financial press.[2] A leading authority on petroleum accounting, Stanley Porter, has put the problem in a wider perspective and drawn a conflicting conclusion:

> 'Variations in the accounting treatment accorded apparently similar transactions are common to all phases of the accounting for petroleum exploration, development and production operations. Differences resulting from these variations may each have a significant and material effect for a small and/or non-integrated producer, but in the matter of comparison between major companies most of these differences will not materially affect the financial statements.'[3]

It has been suggested that accounting principles may not be uniformly applicable to small or developing companies and larger or mature ones.[4] This indicates that our problem may be restated in a form suitable for testing: does the use by major oil companies of different accounting principles and methods render the financial statements of those companies non-comparable? The objective of this study is to draw attention to the more significant possibilities of variation in accounting principles and methods available to oil companies, which would tend to establish the prima-facie case for the affirmative, and then to examine the financial statements of a selected group of oil companies in order to verify or contradict this case.

Petroleum Accounting Practices

As stated previously, emphasis has been placed by the industry's critics on the 'full-cost' versus 'successful efforts' controversy. This has become known, largely as a result of the Field Report, as the 'cost center problem', but I have pointed out elsewhere that this phrase over-simplifies.[5] According to the A.P.B.'s Committee on Extractive Industries:

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[1] *Financial Reporting in the Extractive Industries*, An Accounting Research Study by Robert E. Field, American Institute of Certified Public Accountants, 1969.

[2] Most recently in 'The Numbers Game', *Forbes*, December 1st, 1973, pp. 49–50.

[3] Stanley P. Porter, *Petroleum Accounting Practices*, McGraw-Hill Book Co., 1965, p. 322.

[4] For example, by Dr. Herbert Miller in his address: 'Accounting Problems of a Company in its Development Stage', given at North Texas State University on November 16th, 1971. See also Financial Accounting Standards Board, 'Accounting for Research and Development and Similar Costs', December 28th, 1973.

> 'The basic concept of the full-cost method is that all costs, productive and non-productive, incurred in the search for oil and gas reserves should be capitalized and amortized to income as the total oil and gas reserves are produced and sold. The basic concept of the successful efforts method is that all costs which of themselves do not result directly in the discovery of oil and gas reserves have no future benefit in terms of future revenues and should be expensed as incurred'.

In order to see why this is an over-simplification we may examine the alternatives available to an oil company faced with the problem of accounting for exploration for and production of oil and gas.

(1) Research and development costs. These are an element in the operations of integrated producers which may be capitalized, or charged to expense, or some combination of both; in the case of capitalized costs, the method of amortization may vary.

(2) Prospecting costs may be capitalized or charged to expense; costs deferred may be amortized by reference to current producing properties or against future production. There is a difference in practice arising out of the fact that some prospecting costs are incurred by the firm directly and some are payments to outside contractors; the latter are more likely to be capitalized by some firms.

The prospecting costs capitalized may be restricted to costs in respect of acreage acquired and retained. The overheads of the geological and geophysical operations may be capitalized or expensed; if capitalized, they may be amortized in different ways.

It is important to recognize that the phrase 'charged to expense' does not imply 'in the period incurred'. A firm which capitalizes only prospecting costs relating to acreage acquired and retained may capitalize *all* prospecting costs pending the determination of this question. Even a firm which expenses all of its prospecting costs may adopt some form of inter-period allocation where the incidence of these costs fluctuates.

(3) Exploration costs are widely believed to follow the 'successful efforts' versus 'full-cost' dichotomy. Again, the fact that a firm charges exploration costs of unsuccessful efforts to expense when the determination is made implies that there is deferral, and since an exploration could take three years or more to complete, the amount charged to expense in any year could be quite unrelated to the expenditure of that year.

There is also some retroactive capitalization, where a well previously regarded as unsuccessful with related exploration costs charged to expense, is subsequently re-evaluated. The credit could be to current expense, or to an amortization reserve.

(4) Exploration costs are also affected by the complicated legal arrangements covering property rights and joint operations which are a substantial feature of all major oil companies' operations. Where payments are made by one firm to another, or collaborating firms bear joint costs in different proportions, a number of potential sources of differences in accounting treatment arise; credit revenue, or credit expense, or defer the credit to amortize over future production.

(5) Property acquisition normally follows successful exploration but considerable sums are expended on acquiring 'undeveloped properties', or areas to be explored. These are usually capitalized although land department overheads may all be expensed, or all charged to properties acquired and retained. Maintenance expenses (taxes, delay rentals, operating losses and renewal payments) may be charged to expense even where the initial lease bonus was capitalized. The practice of expensing costs incurred by the company, and deferring payments to outside contractors, is also found here.

Where some or all expenditures for undeveloped properties are capitalized, there is the alternative of either waiting until the determination of success or failure, or amortizing the expenditures during the exploration period. The so-called 'full-costers' include the expenditure in the depletion base, so that this is peculiarly a problem for the 'successful efforts' firms. Where amortization is practiced, 'dry holes' are usually written-off to the accumulated amortization account; expense 'dry holes' for the period may be simply a charge for amortization. Again, the amount transferred to 'producing properties' where success is recognized may be either the total property acquisition costs, or costs less amortization to date.

The problem of joint ventures previously referred to is also encountered here.

(6) The development of the producing property is accomplished by drilling, and development costs are invariably divided into 'equipment' and 'intangible drilling and development'. Although the

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[5] Kenneth S. Most, 'The Cost Center Problem in the Oil Industry', *Management Accounting*, December, 1972, pp. 39–41 and 47.

basic record-keeping in the industry is fairly standardized, and based on the 'authorization for expenditure' or AFE, there are many different approaches to accounting for development costs. These may be accumulated by AFE, or by cost center, or charged to expense or capitalized first and then allocated. The firm may not even charge its own costs of development, where joint operations are involved, but may charge at competitive rates; although unrealized profits will be eliminated, the accounting for any difference between actual share and proportionate share in joint costs provides several variations. A concealed problem in development accounting is the treatment of exploration costs which benefit production. In the case of an off-shore platform, for example, a substantial portion of the construction work necessary for exploration is also necessary for production, with some modification of the superstructure. It is clear that judgment must play a large part in deciding which exploration costs are to be capitalized under the heading 'producing properties'.

Complex production accounting, which involves accounting for minimum and shut-in royalties, for take-or-pay contracts, for carried, retained and carved-out interests of several kinds, and for a host of other situations involving partners, joint operators and drilling funds, provides a range of alternative accounting treatments which 'the cost center problem' does not begin to embrace.

(7) In computing depreciation, depletion and amortization of capitalized costs, the reserves of oil (or gas), revenue from which will have to cover these capitalized costs, are not capable of precise measurement. Thus, we may expect a range of rates, high in the case of so-called 'conservative' companies and low in some other cases, but we may not assume that a 'successful efforts' company will be 'conservative' in the estimation of reserves, and a 'full-coster' will not. It may not even be assumed that all companies compute depletion in the same manner.

(8) The designation 'full-cost company' is deceptive, since the alternatives available to a company which capitalizes all finding and development costs are real and found in practice. For example, Texaco, known as a 'full-coster', states in a note to its financial statements that 'with respect to exploration activities, the company capitalizes lease acquisition costs related to the exploration and development of oil and gas reserves, with the principal exceptions of expenditures in the United States for lease rentals and intangible drilling costs applicable to dry holes'. These expenditures may or may not be material in the case of Texaco.

(9) Another view of a range of accounting alternatives available to oil companies is provided by an annual survey published by a leading firm of public accountants.[6] This survey reveals many differences of consolidation policy, foreign currency translation, treatment of extraordinary items, accounting for income taxes and other matters of contention which are familiar to the student of published financial statements.

The Income Tax Problem

Oil companies are heavy taxpayers and contribute vast sums to many governments throughout the world, in the form of direct and indirect taxation. A minor accounting problem is the treatment of excise taxes, which may be deducted from revenues or included in expenses; since the amount of excise tax paid during the period is invariably revealed, and accruals are not normally significant for this item, the financial statements are easily adjusted to make them comparable.

The amount of income tax expense, on the other hand, is of necessity subject to the influence of both special conditions affecting the individual firm and of differences in accounting treatment arising from judgment. The problem is compounded by the firms' relations with foreign governments, not only in respect of the income source and foreign tax credit aspects, but also because of the types of arrangements made with host governments. Payments made to host governments may be construed as payments for supplies or as payments of taxes, and tax credits obtained under such arrangements may be treated as reductions in the cost of supplies, or in the income tax expense account, or even deferred.

Tax allocation is practiced in a variety of ways, so that the aims of APBO No. 11 cannot be achieved by oil companies.[7] APBO No. 11 expressly excluded regulated industries from the scope of certain of its provisions. The summary on the page following indicates the area of uncertainty.

In fact the only two types of difference between oil company book and tax net income which would appear unequivocally to call for allocation as timing differences are those arising out of accelerated depreciation for tax purposes and amortization of undeveloped properties in the financial accounts.

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[6] 'A Survey of Financial Reporting and Accounting Developments in The Petroleum Industry', New York, Price Waterhouse & Co. The survey of 1972 accounts was published in 1973.

[7] 'Accounting for Income Taxes', APB Opinion No. 11, Accounting Principles Board, December, 1967.

Type of Difference between Book and Tax Net Income	*APB Status*
Percentage depletion in excess of cost depletion	Permanent
Geological and geophysical costs directly related to acquisition of property	Unclear
Proceeds of sale of oil payments taxed at date of sale but deferred in the accounts	Unclear
Intangible drilling and development costs	Not dealt with
Future lifting costs of production to satisfy a retained interest, capitalized in accounts but deducted as incurred for tax	Unclear
Deferred revenue under take-or-pay contracts, or where gas revenue subject to approval of contract price increase, both includible in taxable income in the year revenue accrues to the sales contracts	Unclear

Analysis of Financial Statements

Having established the prima facie case for non-comparability, which emerges from consideration of the many possible points of divergence between the accounts of oil companies, the next step is to analyze the financial statements of a group of selected oil companies with the object of determining to what extent these differences appear to have a material effect on such an inter-firm comparison. The methodology is the same as that used in attempting to compare the financial statements of a selected group of international chemical companies.[8]

The selection proceeded by identifying several major oil companies which appeared comparable on grounds of size and type of operations and which competed in the same capital and product markets. These were then sub-divided into two groups, on the same basis:

(1) Exxon, Gulf and Texaco,

(2) Atlantic Richfield (ARCO), Phillips, Getty and Union.

The published financial statements of these seven oil companies for the year 1972 were converted to a common form, with some loss of information which was not regarded as significant at this stage. This was done for balance sheet, income statement and funds statement (called by different names in 1972). The results of this operation are shown in Exhibits I – III.

The figures thus obtained were then converted into common size financial statements. Assets and liabilities were expressed as percentages of total assets; revenues and expenses as percentages of net sales and other operating revenues, and fund statement items as percentages of the sum of changes in financial position. The results of this operation are shown on Exhibits IV to VI.

In interpreting the common size financial statements certain assumptions were made:

(a) That the financial reports from which they were derived were prepared honestly and without any intention to deceive. It is clear that the opportunity for producing fraudulent or deceptive information is available to the management of an oil company, just as it is to the management of any other company; indeed, there is probably more opportunity in this industry than in any other. This assumption of regularity is justified by the fact that the size of these companies precludes any complex scheme of deception, and a combination of professional accountants and internal and external auditors serves to prevent a simple one from succeeding.

(b) That in order to be comparable, financial statements need not be identical; the purpose of comparison being to elicit differences of financial and asset structure and of operating results, differences are not necessarily evidence of non-comparability.

(c) That the question of comparability could be resolved in one of two ways:

(i) the differences in the common-size figures appear to be immaterial, or

(ii) the differences between the common-size figures, though material, are not consistent with the known differences in accounting principles and practices.

(d) That conclusions drawn from the common size financial statements are also applicable to the financial statements of the seven companies.

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[8] 'How Bad are European Accounts?' by Kenneth S. Most, *Accountancy*, January 1964, reprinted in *Readings in International Accounting*, ed. Berg, Mueller and Walker, Houghton Mifflin Company, 1969, pp. 208–222.

EXHIBIT I

Seven Major Oil Companies
Common Form Financial Statements – 1972
Balance Sheets (in $ millions)

Assets	*Exxon*	*Texaco*	*Gulf*	*ARCO*	*Phillips*	*Union*	*Getty*
Fixed Assets –							
gross	22,327	11,839	10,862	5,733	3,914	3,700	3,168
accumulated depreciation and depletion	9,682	3,990	5,444	2,689	2,056	1,936	1,683
net	12,645	7,849	5,418	3,044	1,858	1,764	1,485
Current assets	7,098	3,119	2,936	1,122	1,003	717	572
Other Assets (investments and deferrals)	1,815	1,064	970	463	409	215	125
Total Assets	21,558	12,032	9,324	4,629	3,270	2,696	2,182
Capital and Liabilities							
Stockholders' equity –							
capital stock	2,637	2,240	1,480	999	608	502	94
retained earnings	9,632	4,935	3,929	1,969	1,279	1,103	1,379
total	12,269	7,175	5,409	2,968	1,887	1,605	1,473
Minority interests	536	92	247		5	19	199
Long-term debt	2,618	1,360	1,941	810	792	578	113
Current liabilities	4,707	2,163	1,492	654	483	382	312
Deferrals and other reserves –							
tax	750	1,171	141	57	61	36	11
other	678	71	94	140	42	76	74
total	1,428	1,242	235	197	103	112	85
Total Capital and Liabilities	21,558	12,032	9,324	4,629	3,270	2,696	2,182

Principal Structural Differences Observed

It is apparent from inspection of Exhibits IV - VI that there are differences in asset and liability structure, in income statement structure and in the composition of the flow of funds. There are also marked similarities, even between Texaco, the known 'full-coster' and the other companies.

Texaco has the lowest gross fixed assets to total assets ratio but not significantly lower than Exxon. Texaco's proportion of accumulated depreciation to gross fixed assets is significantly lower than any of the other companies. Thus, although Texaco's ratio of net fixed assets to total assets is virtually the same as ARCO, Getty and Union, the figures suggest that either their composition and age are very different, or that accounting principles and methods are responsible.

Texaco has the lowest ratio of current assets to total assets, but not significantly lower than Getty or Union. Current ratios vary from 1.44 to 2.07, with Texaco the lowest.

Exxon has the lowest proprietary (equity) ratio but only ARCO and Getty are significantly higher. Phillips has the highest debt ratio and Getty the lowest; the others are similar. Texaco's tax deferrals were significantly higher than for any other company.

Percentages of net sales for purchases and operating expenses showed wide variations. Texaco's was highest; ARCO, Phillips, Getty and Union fairly similar and Exxon and Gulf the lowest; the last two were virtually identical and well below the other companies. Selling, general and administrative expenses varied widely, Gulf having the highest ratio to net sales, Getty the lowest. Exxon, Phillips and Union were very similar. Exxon and Texaco had virtually the same ratio of depreciation, depletion and amortization, and the other five companies fell within a narrow range of each other. Taxes showed large differences; Texaco charged the lowest excise taxes and Gulf, ARCO and Union were very similar. Phillips showed the lowest ratio of income and general taxes paid, Exxon the highest. Exxon and Gulf were significantly higher than the other

EXHIBIT II

Seven Major Oil Companies
Common Form Financial Statements – 1972
Income Statements (in $ millions)

Revenues	*Exxon*	*Texaco*	*Gulf*	*ARCO*	*Phillips*	*Union*	*Getty*
Sales and other operating revenues	22,070	8,693	7,624	3,831	2,810	2,426	1,541
Dividends, interest and royalties	368	279	109	68	55	32	22
Total Revenues	22,438	9,872	7,733	3,899	2,865	2,458	1,563
Expenses							
Purchases and operating	9,295	6,103	3,210	2,326	1,712	1,384	966
Selling, general and administrative	2,104	711	921	326	298	253	120
Depreciation, depletion and amortization	1,060	427	576	243	223	199	122
Interest	271	108	147	62	59	41	7
Taxes – income and general	6,335	556	1,381	240	128	130	123
– excise	1,761	254	1,051	510	297	328	136
Total Expenses	20,826	8,069	7,286	3,707	2,717	2,335	1,474
Net income after taxes, before minority interest	1,612	903	447	192	148	123	89
Minority interest	80	14				1	13
Net income attributable to stockholders	1,532	889	447	192	148	122	76
Extraordinary items – net			–250	3			5
Net income after extraordinary items	1,532	889	197	195	148	122	81
Dividends	852	452	311	132	98	69	24
Additions to/reduction of retained earnings	680	437	–114	63	50	53	57

companies; this observation, coupled with the ratios of purchases and operating expenses, suggests that some items showed as taxes by Exxon and Gulf may be accounted for as purchases by the other companies.

If we exclude from consideration the extraordinary items reported by Gulf, net income after taxes but before minority interest was remarkably consistent for all companies except Texaco, which showed twice as high a net margin as the other companies excluding Exxon.

From the funds statements we can see that the percentage of funds provided by operations was high for all companies, with Exxon the highest, but Texaco, Union and Getty were not very much different. Exxon, Gulf, ARCO and Phillips appear to have reduced their outside financing during 1972, but Union and Texaco increased this source during the year.

Somewhat surprisingly, the ratio of net income after taxes (but before minority interests) to total assets was identical for Exxon and Texaco (7.5%) and very similar for the other companies (4.1% to 4.8%). Again, the ratio of net income available to stockholders to stockholders equity was almost identical for Exxon and Texaco (12.5% and 12.4%) whereas the same ratio for the other companies varied between 5.2% and 8.3%.

Conclusion

It cannot be said that the analysis suggests strongly either that different accounting principles and methods render the financial statements of these seven companies non-comparable, or that these differences have no material effects on the comparison. Rather the conclusion to be drawn is that the statements are comparable and that the differences observed in making the comparisons lead directly to questions aimed at judging the quality of the operating results reported by the companies.

In terms of accounting principles and methods, the study confirms the potential significance of differences in the capitalization policies of all the companies and in the methods they use for computing depreciation, depletion and amortization. It also confirms the known differences in tax deferral practices. Of particular interest is the substantial difference between Exxon and Gulf, on the one hand, and the other five companies, in respect of both purchases and operating expenses and income and general taxes. This difference, which has not been identified by any of the critics or defenders of the industry's accounting practices, appears to have much more significance than the 'successful efforts' versus 'full-cost' controversy.

In short, a skilled analyst can use the financial reports of these seven major oil and gas companies as a point of departure for arriving at judgments on solvency, profitability and stability of earnings to the same extent as in any other inter-firm comparison and is not noticeably handicapped by the variety of accounting principles and methods used by the companies.

EXHIBIT III

Seven Major Oil Companies

Common Form Financial Statements – 1972

Funds Statements (in $ millions)

Sources	*Exxon*	*Texaco*	*Gulf*	*ARCO*	*Phillips*	*Union*	*Getty*
Net income attributable to stockholders	1,532	889	447	192	148	123	76
Minority interest in net income	81	14	22[1]			1	13
Depreciation, depletion and amortization	1,060	427	576	243	223	199	122
Other adjustments	179	–12	45	44	–4	84	62
Provided by operations	2,852	1,318	1,090	479	367	407	273
Sales of properties and investments	161	60	207	215	55	44	49
Other reductions in investments			115	53			16
Increase in long-term debt	547	124	129		50	70	17
Issue of capital stock				7	20		
Decreases in working capital	69	210					
Other sources			14		4		
Total Sources	3,629	1,712	1,555	754	496	521	355
Uses							
Investments in fixed assets	1,983	1,112	678	364	265	316	273
Other investments	115	26	48		11	11	
Reduction in long-term debt	603	54	331	46	58	38	9
Reduction in capital stock		9					14
Cash dividends – stockholders	852	452	311	132	98	69	24
– minority interests	41	4	11				4
Increases in working capital			176	168	62	78	28
Other uses	35	55		44	2	9	3
Total Uses	3,629	1,712	1,555	754	496	521	355

[1] Not shown on income statement

EXHIBIT IV

Seven Major Oil Companies
Common Size Financial Statements – 1972
Balance Sheets – % of Total Assets

Assets	*Exxon*	*Texaco*	*Gulf*	*ARCO*	*Phillips*	*Union*	*Getty*
Fixed assets –							
gross	103.6	98.4	116.5	123.8	119.7	137.2	145.2
accumulated depreciation and depletion	45.0	33.0	58.3	58.0	62.9	72.2	77.2
net	58.6	65.4	58.2	65.8	56.8	65.0	68.0
Current assets	32.9	25.9	31.4	24.2	30.7	27.0	26.0
Other assets	8.5	8.7	10.4	10.0	12.5	8.0	6.0
Total Assets	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Capital and Liabilities							
Stockholders' equity – capital stock	12.2	18.6	15.9	21.6	18.6	18.0	4.0
– retained earnings	44.6	41.1	42.1	42.5	39.1	41.0	63.0
total	56.8	59.7	58.0	64.1	57.7	59.0	67.0
Minority interests	2.5	0.7	2.6		0.1	1.0	9.0
Long-term debt	12.0	11.4	20.8	17.5	24.2	21.0	5.0
Current liabilities	22.0	18.0	16.0	14.1	14.8	14.0	15.0
Deferrals and other reserves – tax	3.5	.97	1.6	1.2	1.9	2.0	0.5
– other	3.2	0.5	1.0	3.1	1.3	3.0	3.5
Total Capital and Liabilities	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Accumulated depreciation and depletion/gross fixed assets %	43.4	33.0	50.0	46.9	52.5	52.6	53.2
Current ratio	1.5	1.4	2.0	1.7	2.1	1.9	1.8

EXHIBIT V

Seven Major Oil Companies
Common Size Financial Statements – 1972
Income Statements – % of Sales

	Exxon	*Texaco*	*Gulf*	*ARCO*	*Phillips*	*Union*	*Getty*
Sales and other operating revenues	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Dividends, interest and royalties	1.6	3.2	1.4	1.8	1.9	1.1	1.4
	101.6	103.2	101.4	101.8	101.9	101.1	101.4
Purchases and operating expenses	42.2	69.2	42.1	60.7	60.9	57.0	62.7
Selling, general and administrative expenses	9.6	8.2	12.0	8.5	10.6	10.4	7.9
Depreciation, depletion and amortization	4.8	4.9	7.7	6.3	7.9	8.2	7.8
Interest expense	1.2	1.2	1.9	1.6	2.1	1.7	0.5
Taxes – income and general	28.8	6.4	18.0	6.3	4.5	5.4	7.9
– excise	8.0	2.9	13.8	13.3	10.6	13.5	8.8
Total Expenses	94.6	92.8	95.5	96.7	96.6	96.2	95.6
Net income after taxes, before minority interest	7.3	10.4	5.9	5.0	5.3	5.1	5.8
Minority interest	0.3	0.2					0.8
Net income attributable to stockholders	6.9	10.2	5.9	5.0	5.3	5.1	5.0
Extraordinary items – net			3.3				0.3
Net income after extraordinary items	6.9	10.2	2.6	5.0	5.3	5.1	5.3
Dividends	3.8	5.2	4.1	3.4	3.5	2.8	1.6
Additions to/reduction of retained earnings	3.1	5.0	1.5	1.6	1.8	2.3	3.7
Net income after taxes/total assets	7.5	7.5	4.8	4.2	4.6	4.6	4.1
Net income attributable/stockholders equity	12.5	12.4	8.3	6.5	7.8	7.6	5.2
Depreciation, depletion and amortization/gross fixed assets	4.7	3.6	5.3	4.2	5.7	5.4	3.9

EXHIBIT VI

Seven Major Oil Companies
Common Size Financial Statements – 1972
Funds Statement – % of Total Sources/Uses

Sources	*Exxon*	*Texaco*	*Gulf*	*ARCO*	*Phillips*	*Union*	*Getty*
Net income attributable to stockholders	42.2	51.9	28.7	25.5	29.8	23.6	21.4
Minority interest in net income	2.2	0.9	1.4				3.6
Depreciation, depletion and amortization	29.2	24.9	37.0	32.2	44.9	38.3	34.5
Other adjustments	5.0	–0.7	2.9	5.8	–0.7	16.2	17.4
Provided by operations	78.6	77.0	70.0	63.5	74.0	78.1	76.9
Sales of properties and investments	4.4	3.5	13.3	28.5	11.1	8.4	13.8
Other reductions in investments			7.4	7.0			4.6
Increase in long-term debt	15.1	7.2	8.3		10.0	13.5	4.7
Increase in capital stock				1.0	4.0		
Decreases in working capital	1.9	12.3	1.0		0.9		
Other sources							
Total Sources	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Uses							
Investments in fixed assets	54.7	65.0	43.6	48.3	53.4	60.5	76.9
Other investments	3.2	1.5	3.1		2.2	2.1	
Reduction in long-term debt	16.6	3.2	21.3	6.1	11.7	7.3	2.5
Reduction in capital stock		0.5					3.9
Cash dividends – stockholders	23.5	26.4	20.0	17.5	19.7	13.2	6.8
– minority interest	1.1	0.2	0.7				1.1
Increases in working capital			11.3	22.3	12.5	15.0	7.9
Other uses	0.9	3.2		5.8	0.5	1.9	0.9
Total Uses	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Using Computers in Small Company Cash Management

C. A. Rands, R. Vause and K. G. Pemberton

Currently one of the key problems facing the management of small companies is the control of cash movements. However profitable a company may be, its future will be placed at considerable risk if it experiences a cash shortage; for if there is insufficient cash to pay wages and creditors' bills, then a sound Profit and Loss Account surplus is of little assistance. For this reason the profit shown by a company has long been recognised as only one indicator of overall performance and effective management. The Cash Flow statement is now seen by many managers to be as important as the Profit and Loss Account and critical to successful management in the small company, since the generation of an accounting profit alone does not guarantee survival for any company. This has been evidenced by the spectacular failure due to cash shortages of several major concerns in recent years. With current trends, a company not putting full effort into cash management does not deserve to survive.

The problems encountered in analysing and forecasting cash movements require for their solution special skills and training, which are usually beyond the abilities of small company management. Often in the small company the only occasion when a real effort is made in cash forecasting is to support a request for overdraft facilities from a bank, and here assistance is often obtained from the bank manager.[1] The clearing banks have, over the last few years, become more sensitive to the needs of the small firms which cannot afford the services of a full-time qualified accountant, and tend to take a sympathetic view of their problems. Despite this, the company which finds itself faced with cash problems which could easily have been predicted through a simple cash budgeting exercise can expect little sympathy from its bank manager.

When a company finds itself faced with a cash crisis, several questions may be raised:

How was the cash crisis discovered?

Did one particular decision precipitate the crisis?

What steps are necessary to remedy the situation?

Could the crisis have been seen earlier, so that action could have been taken more quickly?

The first sign of cash shortage in a typical small company is often the inability to pay a supplier's bill when it falls due. In these circumstances remedial action often tends to be arbitrary and unplanned. A typical response to such a cash shortage is to delay as long as possible the less demanding creditors, and to try to speed up the cash flow from existing debtors. However this kind of action can only be a short term palliative, and usually does little to get to the root causes of the company's difficulties. It is the intention of this article to show how computers can provide assistance in cash planning for small companies, and can do this at minimal cost in both time and money.

The Cash Flow Problem

The cash flow of a company, and the residual cash balance which is available, is the result of complicated movements of money into materials and services, and the provision of more resources which are then turned into cash by the sales generated by the company.[2] The difficulties which companies meet are often due to a number of complementary factors, such as the time delays between the purchase of raw materials and their sale as finished goods, seasonalities in trading, and the payment of large sums of money at particular times of the year (e.g. Corporation Tax and VAT). Many of these factors impinge on each other in a complex way, making a manager's prediction of cash movements and cash balances little more than guesstimates. The problem is made more acute in that many of these factors behave in a random way and tend to change unpredictably, so that as often as not managers' forecasts are soon overtaken by events.

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[1] For example Barclays Bank launched a new service (Barclays Business Advisory Service) in 1973, which offers the smaller firm advice in all aspects of financial management.

[2] The flow of cash in working capital can be found explained in any financial textbook.

As a result in this area of financial management many managers face such a complicated problem that they are not really able to discover a satisfactory solution. As a consequence they have little chance of being able to predict the occurrence of a cash crisis before it happens, and so take remedial action with plenty of time in hand.

However work has been done in the areas of Systems Analysis and Statistics which is relevant to the cash flow problem. This now offers the possibility of realistic and meaningful cash budgets, appropriate allowances being made for the uncertainties in the inflows and outflows of cash. In particular there has been substantial development work which allows relatively simple computer models to be built of the flow of resources in an organisation, the data movements which record these flows, and the decisions which allocate these resources.

Until recently one of the major obstacles to the use of computer models in analysing the cash flows of small companies has been the complexity and cost of the models. Much of this cost in incurred in collecting basic data about the company, and writing the computer programs. However over the last few years work at the Oxford Management Centre has resulted in many of these obstacles to computer modelling being overcome. The stage has been reached where computer models of the cash flow patterns of a small company may easily be produced, using information which is readily available.

Use of the Computer Model

The approach developed at Oxford is intended to provide the managers in a small firm with the means of identifying early the development of cash problems. It also allows them to conduct a simple sensitivity analysis to show the likely results of possible alternative courses of action that might be adopted. In any managerial situation a manager must be able to do these two things, and should recognise that both are equally important to him. In particular unless he can identify that a cash problem exists, or is developing. then no corrective action will be taken, and the problem will continue to develop unnoticed.

In the management of cash movements it is often difficult to discover that a cash flow problem is developing, because random fluctuations in cash movements often disguise the trend patterns which lie behind them. An important part of the method developed at Oxford, therefore, is concerned with helping a manager to identify whether adverse trends are developing, by isolating these trends from random movements in cash. The basic way in which this is done is by the use of control charts. These contain control lines which, if exceeded, stimulate managers to question whether a trend is beginning to develop which will ultimately require action. The way in which these control lines may be interpreted in controlling cash flows has already been described beforehand,[3] using simply statistical techniques, and the method will not be described again here. The approach developed at Oxford is that the computer model is used to produce the control charts against which the manager plots actual cash movements. This is done by the model predicting the expected cash flows likely to occur over the planning horizon, and then estimating the likely variations in cash flow which could occur from this best estimate. The model therefore indicates to the manager the uncertainties present in the cash forecasts, against which he can compare actual cash movements.

Constructing and Operating the Computer Model

As the computer model has been developed with the smaller firm in mind, there is a very great constraint in the amount of information which can realistically be available to prepare the model and run the system, Therefore the model has been designed to operate on data inputs which any small firm would be expected to provide. Typically these consist of delays in receiving cash for goods sold, and paying for materials received, as well as estimates and actual details of wages, salaries, overheads, material purchases and sales revenues.

The manner in which a typical model is operated is shown in Fig. 1. There are a number of inputs to the model, namely the manager's forecasts of the external environment, e.g. the expected receipt of sales orders, and the decisions the manager expects to take. These decisions could include the pattern of goods deliveries he plans based on the orders in hand, as well as the labour input he has decided to make. Built into the computer model are the relationships in the company's cash flow pattern as well as basic assumptions about such factors as the delay between goods being delivered and cash being received. The outputs from the model are predictions of the net cash flow in the company, as well as estimates of the likely variations which could occur in that flow.

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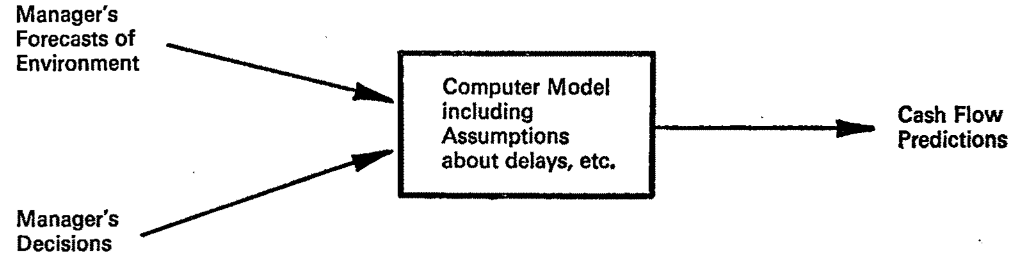
[3] An example of the use of control lines in controlling cash may be found in the *Banker* July and November, 1972.
R. Vause, N. Woodward, T. Rands – A Control System for the Branch Manager.

Figure 1 Operation of the Model


Manager's Forecasts of Environment
Manager's Decisions
Computer Model including Assumptions about delays, etc.
Cash Flow Predictions

An Example of the Use of the Model

In an example which will be discussed to illustrate the use of the model, a small electronics company was taken. The data base used for preparing the company model is set out in Table 1. This shows the basic cash movements into materials, labour etc., for the year 1973. It can be seen that the information contained in Table 1 is no more than the fundamental required to monitor where cash is moving in the company. It can also be seen that the company uses some of its own accounting conventions – e.g. that materials and overheads creditors are together.

The first stage in developing the model is to measure the delays in the movement of resources. The most important delays in the movement of cash are delays in receiving money for goods delivered to customers, and delays in paying for goods received from suppliers. Another delay in cash payments which is also significant is the payment of VAT for goods delivered and received. In general it is a simple task to calculate the average credit period which the company and its customers are taking. However it is also necessary to calculate the variations in the credit taken, because this variation will cause uncertainties in the cash inflow and outflow to the company. The calculation of this variation may be done by examining the nature of changes in the total credit level outstanding throughout the period covered by Table 1.

Applying this method to the receipt of cash for sales delivered shows the average credit taken by customers to be 2.62 months. A statistical analysis shows that the credit period represented by the debtors varies randomly month by month, following a Normal Probability Distribution pattern with a Standard Deviation of 0.234 months. In a similar manner it may be shown that the average credit taken by the company from its trade suppliers is 2.88 months, following a Normal Distribution with a Standard Deviation of 0.186 months.

It can be seen that the data contained in Table 1 embraces the period when VAT was introduced in April 1973. In actual fact the values in Table 1 for the period after April 73 exclude the VAT component, although VAT was added into the computer model. For this company, the VAT accounting periods are at the end of February, May, August and November, with payments being due one month later.

The structure of the model developed for the company is shown in Fig. 2. This shows at which stages managers' forecasts are used, and where decisions are inputs into the model. It can also be seen that the outputs from the model are forecasts of the net cash flows into the company, identifying separately the cash received for goods delivered, and the cash paid out for goods received and overheads incurred.

A typical forecast and set of decisions which would be fed into the model is shown in Table 2. This shows the sales deliveries the manager expects to make, given the orders he already has on hand and the priorities he has quoted to customers. At the same time the manager has included the materials he expects to receive, given the Orders he has placed on suppliers and the additional orders he will have to place to satisfy orders on hand for work. Table 2 also contains the manager's estimate of the labour costs required in order to meet the planned delivery patterns. In this input VAT has been included.

The outputs from the model for these inputs are shown in Figs. 3 to 7. Fig. 3 shows the expected cumulative receipts of cash predicted by the model and includes also the cumulative deliveries planned by the managers. In Fig. 3 therefore, the vertical

TABLE 1

Basic data on the electronics company from which the model was constructed (VAT excluded)

	1973 *Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*
Orders received	18,000	31,000	32,000	35,645	36,000	22,610	16,735	55,875	11,200	7,200	33,260	42,050
Sales delivered	19,344	21,943	19,415	23,002	27,625	25,030	18,015	29,553	24,246	17,180	29,233	41,164
Mats. bought	5,450	10,101	8,653	17,919	6,903	7,963	5,402	10,057	9,456	5,464	7,619	12,219
Labour:												
Weekly	6,088	6,744	8,096	7,009	7,652	9,810	6,822	10,236	7,241	4,970	9,726	9,720
Monthly	2,500	2,465	2,465	2,700	2,710	2,830	2,446	2,560	2,856	2,693	2,444	2,363
O/H Incurred	4,500	2,800	7,100	4,344	4,281	4,122	6,076	6,011	7,531	2,620	2,865	4,955
Debtors	71,000	70,818	60,609	62,328	73,727	73,862	69,709	68,934	73,312	59,596	57,928	77,473
Creditors (Mats. + O/H)	30,294	25,990	23,726	40,280	37,487	39,747	37,463	40,858	46,049	36,901	23,031	35,479
Bank (OD)	113,980	110,000	110,533	113,821	122,748	115,508	122,573	112,379	120,390	114,095	112,748	107,359
WIP	38,000	48,000	62,500	75,620	84,240	82,595	81,315	107,860	95,030	85,220	89,470	90,530
Creditors + O/H payments	10,674	7,224	12,635	15,160	16,509	8,952	15,781	13,340	10,707	17,065	7,474	31,481

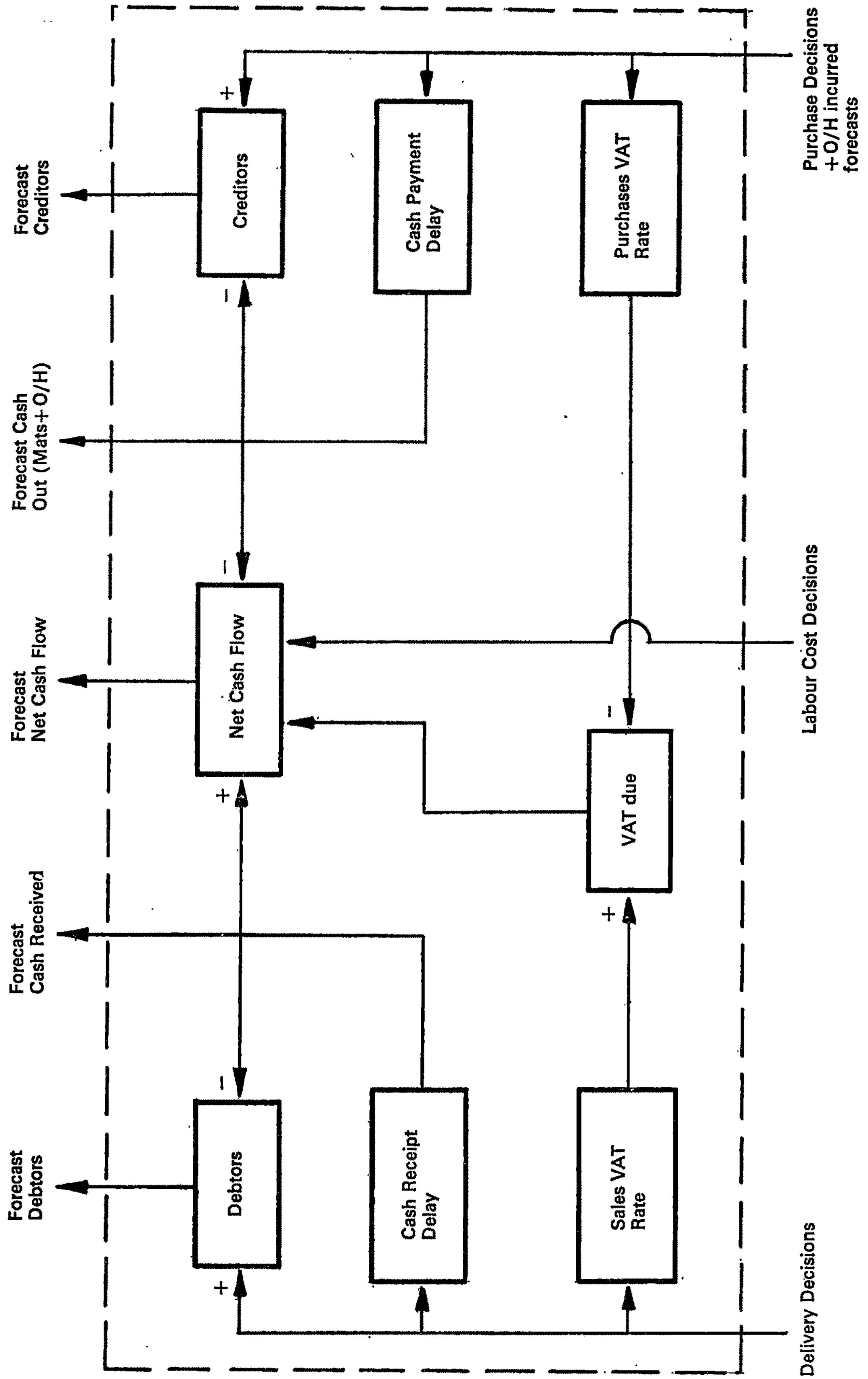


Figure 2 The Model of the Company

TABLE 2
A typical forecast used as input into the model (VAT included)

£'s	1974 January	February	March	April
Sales deliveries anticipated	28,600	33,000	38,500	38,500
Mats. received	9,900	11,000	11,000	12,100
Labour				
Weekly	9,300	9,600	10,000	10,500
Monthly	2,600	2,600	2,400	2,900
O/H	7,000	7,000	7,000	7,000

distance between the lines represents the debtors of the company, with the initial distance between them representing the opening debtors at the end of December (i.e. £77,473). It can be seen in Fig. 3 that the computer has predicted the region in which the actual cumulative cash received line is likely to fall, and has therefore given an indication of the possible variations in the total cash received over the months January to April.

This graph of forecast cash received in Fig. 3 is, in fact, partly conditional on the manager's estimate of what deliveries of sales goods will be made from January to April. For if in any month he does not quite meet his delivery plan, then the cash inflows at a later date will be affected. However it can be seen that even if he does not fully meet his January sales deliveries target, this will make no difference to the cash inflow until March at the earliest, because the cash receipts for January, February and part of March will come from goods already delivered in October, November and December. The computer model contains details of these previous sales deliveries, and estimates the cash inflows in the early months (i.e. January, February and March) from these.

The individual cash inflow expected in any single month is shown in Fig. 4. This also contains control lines which indicate the maximum and minimum expected cash inflow in a single month. It can be seen that the general level of uncertainty on cash inflows in individual months (shown by Fig. 4) is proportionately greater than the uncertainty on the cumulative cash inflows over several months (shown in Fig. 3).

The computer therefore produces two charts for predicting the expected cash inflow into the company from sales deliveries. This is because two charts provide managers with better control than a single chart. The chart of Fig. 4 allows a manager to monitor a single month's cash receipts on its own, so that he can ask questions about this one month if actual receipts fall outside the control limits. Fig. 3 meanwhile allows him to compare the latest month against the previous months, so that he can estimate whether a particularly extreme month indicates that trend changes are beginning to develop of which he ought to take note. The way in which these charts may be used together for determining when corrective action is necessary has already been referred to[3], and a further explanation will not be given here. The thinking behind the use of cumulative charts is given in a number of statistics textbooks,[4] where it can be shown that their main value is in sensing changes in trend which are otherwise undetectable.

The computer also produces two additional graphs, Figs. 5 and 6 to predict the likely cash outflows for materials and overheads. These are also for the cumulative and the individual month's cash values. These graphs may be used in a similar way to the graphs for the cash receipts, in order to monitor whether the company is tending to fall behind in its cash payments, or whether it is catching up somewhat by paying slightly ahead of its normal time. The particular value of Fig. 5 to a manager is that when he plots his actual cumulative payments against his expected, he can easily judge to what extent he has room to manoeuvre should he experience any short term problems.

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[4] Woodward and Goldsmith – Cumulative Sum Techniques, Oliver and Boyd (1964).

Figure 3 Cumulative Forecast of Cash Received (including VAT collections)

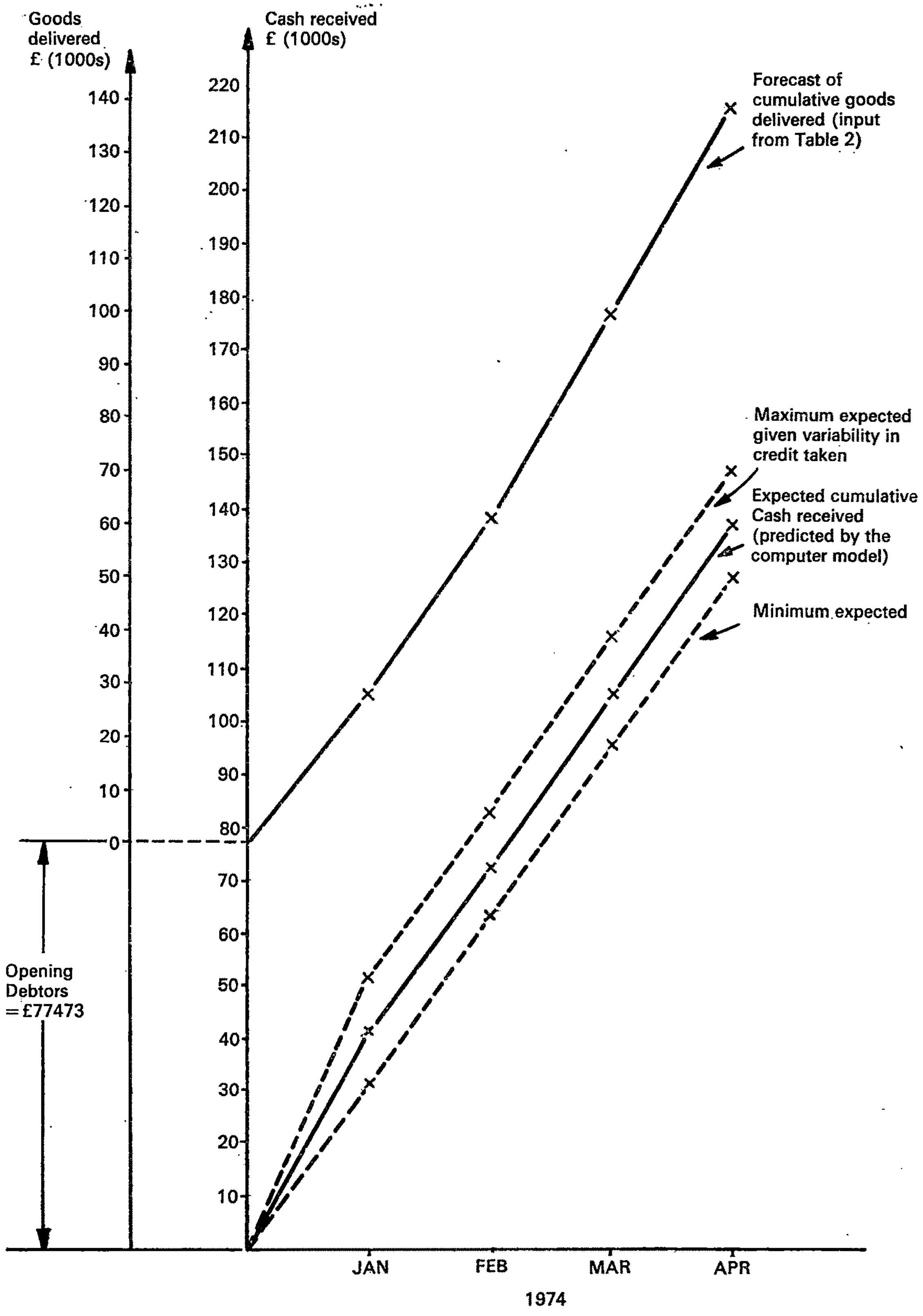


Figure 6 Forecast of Individual Months' Cash paid for Mats. +O/H

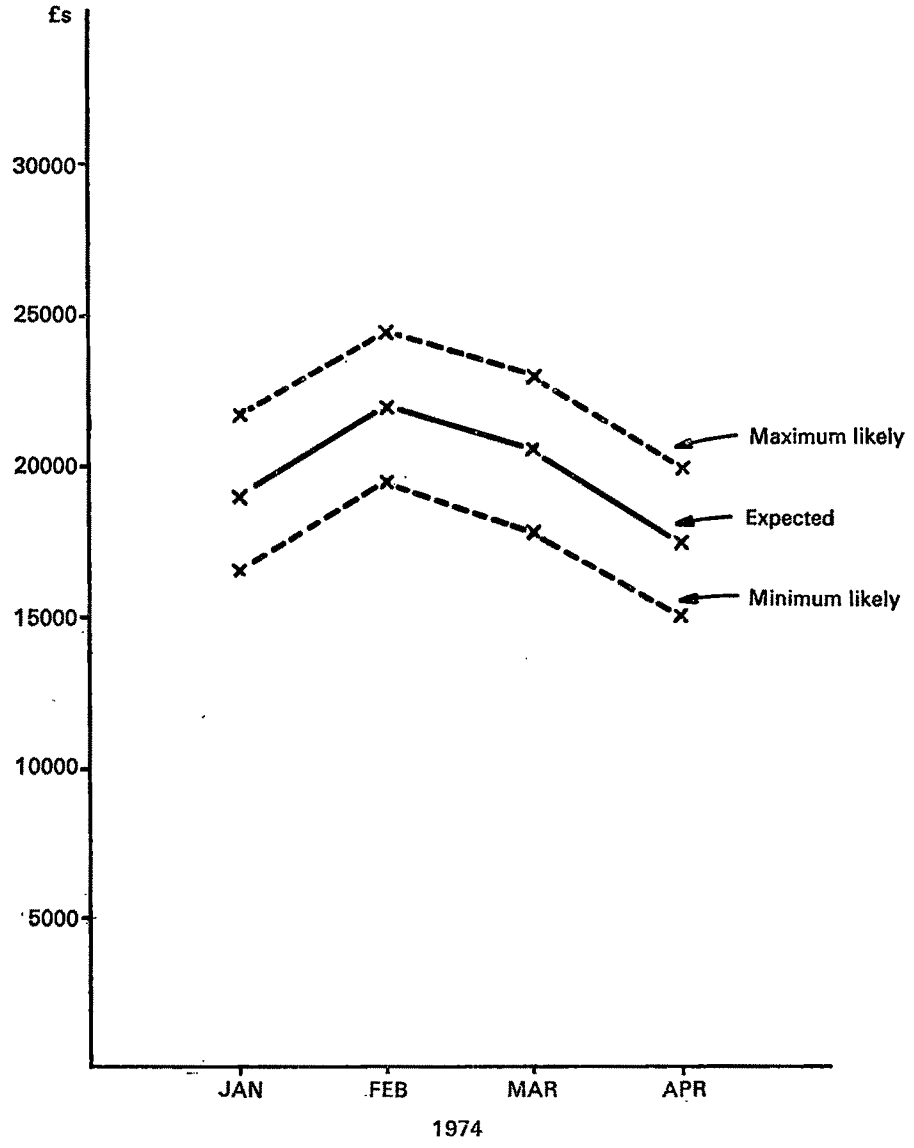
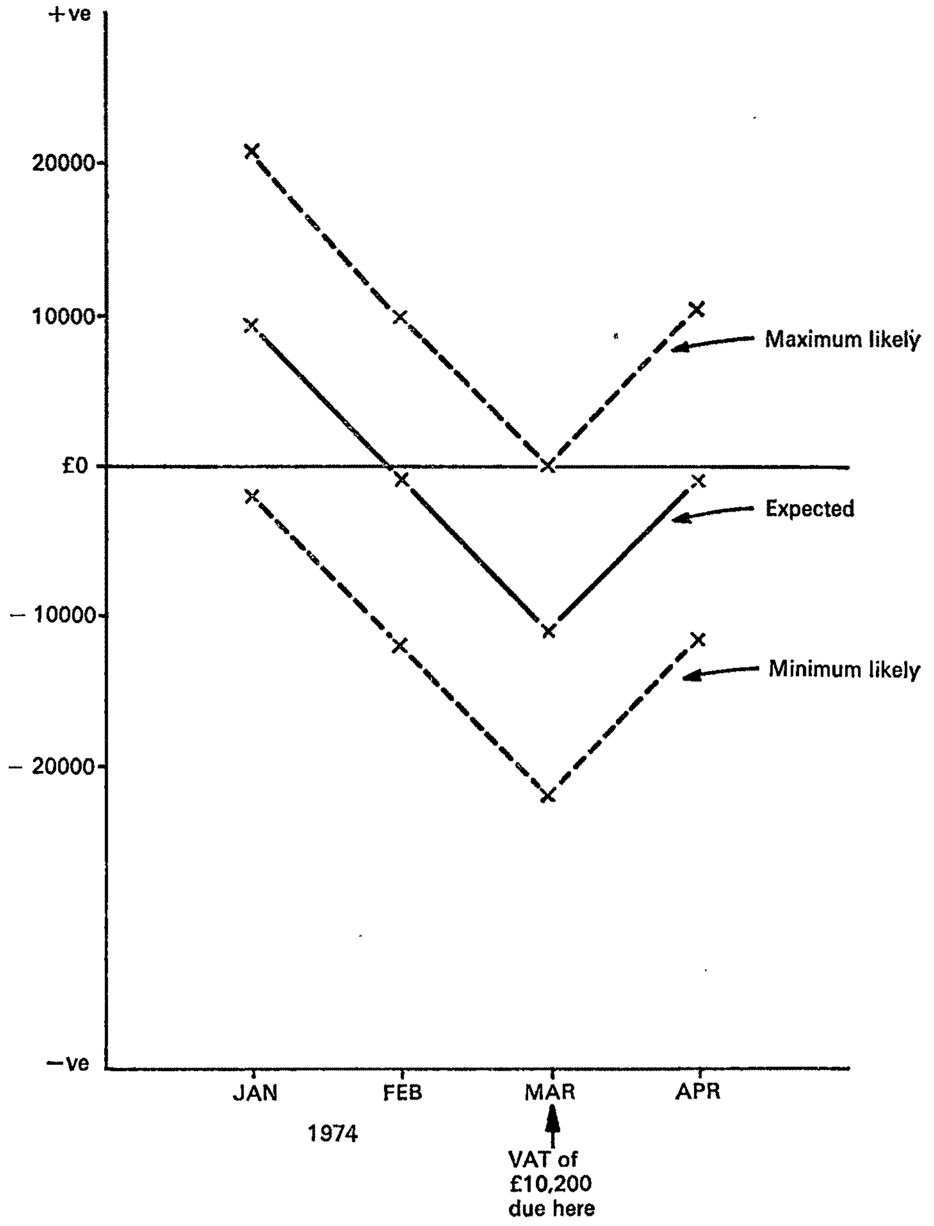


Figure 7 Net Cash Flow in the Company, predicted by the model (VAT payments are included)



Deprival value: Its Use & Abuse
Graeme Macdonald

the time of measurement differs the central concept is the same as that of an *ex ante* measure. The most commonly quoted definition of *ex post* income is that of 'consumption plus capital accumulation',[6] and we assume that it is this that Gray and Wells had in mind when writing of an increase in wealth. However, Hicks himself modifies this *ex post* income measure so that all measurements are made in the light of the knowledge available at the time of measurement.[7] An *ex ante* measure of income $t_0 - t_1$ is based on knowledge at t_0; likewise an *ex post* measure $t_0 - t_1$ is based on knowledge at t_1. Thus for a period $t_0 - t_1$ *ex post* income (Ip) is measured as

$$Ip = R_1^1 + (C_1^1 - C_0^1)$$

where R_1^1 = receipts at t_1
C_1^1 = the value of the future prospect at t_1 as seen at t_1
C_0^1 = the value of the future prospect at t_0 as seen at t_1

The value C_0^1 is given by

$$C_0^1 = \frac{1}{1+r}(R_1^1 + C_1^1)$$

Where r = the rate of interest
and therefore

$$C_0^1 r = R_1^1 + C_1^1 - C_0^1 = Ip$$

Ex post income is thus a standard flow in the same way that *ex ante* income is. Any difference between the two measures will be accounted for by the changes
$R_1^1 - R_1^0$ = differences between actual and anticipated receipts at t_1
$C_1^1 - C_1^0$ = differences between the future prospect at t_1 as seen at t_1 and t_0
where r remains constant.

Both of the above changes will be reflected in the difference $C_0^1 - C_0^0$ since it is now seen that the original prospect C_0^0 which assumed R_1^0 and C_1^0 was wrong. Hicks, following Lindahl,[8] classifies this difference as a capital gain and not as income. The *ex post* income measure Ip is then equal to interest r on

$$C_0^0 + (C_1^0 - C_0^0) = C_0^1$$

If we are to follow Hicks exactly it is clear that the only basis of asset valuation acceptable is the present value of the future net receipts. Two other points should also become apparent. First, not all capital accumulation, or increase in wealth, can automatically be regarded as income; and second, that an *ex post* measure of income, depending as it does on an anticipated future prospect, is only more certain than an *ex ante* measure to the extent that previously anticipated receipts have become actual receipts. On this basis we would suggest that Gray and Wells are not applying the Hicksian income concept, and that in fact neither are many other writers who claim to do so.

The purpose of an income measure

Gray and Wells properly recognise that it is essential to identify the purpose for which a measurement of income is undertaken. Having accepted those hinted at by Parker and Harcourt it is perhaps all the more surprising that they did not then suggest a relevant income definition. In order that we may do so let us therefore outline briefly the purpose we assume in measuring income. The particular objective in mind here is the communication of information to shareholders and creditors, both existing and potential. By definition information (as opposed to raw data) must be relevant to the receivers and this therefore requires a knowledge of their requirements.

It is assumed here that the purpose for which this information is required is to enable investors to choose between alternative investments. The uniformity of language necessary for effective communication is also necessary for purposes of comparison. The investor's interest is in the future cash flows to himself from a company. This would be the case whether or not the investor had an existing interest in the company. If he is already an investor he will need to review his position and decide whether to hold or sell, and/or whether to retain or dispense with the directors. The transmission of information relevant to these decisions can be seen as part of stewardship reporting. The same information should be equally relevant to potential investors considering whether or not to invest in a particular company, and whether to rely on its directors. A measure of income that indicated the amount that a company could distribute and expect to continue to distribute in successive periods might seem relevant to investors, and could be either an *ex ante* (budgeted) or *ex post* (actual) measure. However, this would require an approach identical to that of Hicks and would serve only to produce a standard flow equal to the rate of interest (cost of capital) as applied to the initial value of the prospect (market value of the firm). This method of measurement involves us in circular reasoning in that the cost of capital reflects the risk adjusted income expected, while the income expected is determined by the cost of capital. We suggest therefore that, since investors' income is dependent in the final analysis on the company's ability to generate cash flows through its transactions with third parties, it is information with regard to these cash flows that the investor requires. From this he can make his own decision as to the value of the firm and the likelihood of future distributions.

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[6] See 5, p. 81.

[7] Hicks, J. R., 'Maintaining capital intact: a further suggestion,' reprinted as in 5 above, pp. 132–138.

[8] Lindahl, E. 'The Concept of Income,' reprinted as in 5 above, pp. 54–62.

A measure of business income

Business income may be seen as the end of a productive process, and capital as a fund of productive power measured in terms of a monetary equivalent. It would be reported not in terms of net total receipts in the future discounted back, but rather as actual inflows (subject to adjustment for recognition conventions) in a specific period after allocating to that period, on the basis of benefits consumed, outflows of both past and present periods. The purpose would be to show how much of a period's inflows a company could distribute while retaining its potential for generating the same level of inflows in the future.

In Hicksian terms the gross income (inflows) of the company equals consumption plus capital accumulation as measured in terms of a monetary equivalent. However, it is dangerous to infer from this that net income equals capital accumulation, particularly in times of changing price levels. Gross income is the result of production (in the widest sense of the term). Having been generated as a cash inflow some of it has to be set aside to maintain the productive potential of the company at the level that existed prior to consumption. The remainder, net income, will be available for distribution or retention and will subsist in capital goods, usually at some time cash. Therefore net income can only be said to subsist in real capital accumulation. Thus in times of changing price levels, and so changing monetary equivalents, it is not sufficient to measure net income through the increase in the monetary equivalent of capital. We have to return to the more fundamental concept of net income as the net output of production and measure it accordingly. The income available for distribution can therefore be measured by recording the cash inflows of the period and deducting from them the measure of consumption. In measuring income capital valuation is therefore only strictly useful in so far as it is necessary to measure capital consumed as opposed to capital accumulated.

Capital maintenance and the measurement of consumption

Two categories of consumption can be identified. First, there is the expenditure of cash on service benefits which do not exist as capital; second, there is expenditure which is matched by the acquisition of capital, that is, a physical good or legal right which is the subject matter of ownership. The importance of the distinction is that it is a characteristic of capital that it can be held over time and that its service potential can, within the limits inherent in its physical make-up, be consumed at any time according to the wishes of the owner. Thus while the first category of consumption can be measured, like gross in income, by reference to recorded cash outflows, the second category involves other considerations.

Measuring consumption of capital is fundamentally a question of capital maintenance, and the measurement problem is one of time. There may be a delay between acquisition of capital and its consumption, and during that time prices, on which measures of monetary equivalence are based, may change. Therefore, since we are seeking to measure the amount of cash inflows that must be withheld to maintain the productive potential at its original level, we cannot measure in terms of original cost. A simple example makes this clear:

Example 1

A company invests cash of 90 at t_0 in a machine with a useful life of 3 periods.

The machine is used evenly throughout its life.

Net cash flows from production for periods ending t_1, t_2 and t_3 are 60, 70 and 75 respectively.

The cost of a similar 3 period machine at the times t_1, t_2 and t_3 is 105, 135 and 150 respectively.

Under historic cost accounting the income for the three periods after measuring consumption of capital (depreciation) would be:

	Periods			Total
	$t_0 - t_1$	$t_1 - t_2$	$t_2 - t_3$	t_3
Net cash inflows	60	70	75	205
Depreciation	30	30	30	90
Income	30	40	45	115

It is clear that in retaining 90 up to t_3 we have not maintained the monetary equivalent of the original service potential, nor have we done so in respect of the use in any individual period.

It is suggested that to effectively measure consumption and maintain capital we should follow the Hicksian *ex post* approach. This means revaluing opening capital on the basis of knowledge available at the end of the period, or at the time of consumption, and measuring consumption accordingly. In what follows we assume that the measurement of consumption relates to an asset held at the beginning and end of a period. However, the argument applies equally to assets held for a shorter period of time, stock of raw materials for example, when measurement of consumption would be based on prices ruling at the date of consumption.

Deprival value

In revaluing assets we suggest that it is not only relevant but essential to employ the concept of deprival value. The concept is based on work by Bonbright[9] who was concerned to find a monetary equivalent for the loss suffered by an owner who had been deprived of an asset. In other words the point at issue was what would it cost to put the deprived owner in the same financial position as he was before? In seeking to establish the quantum of the loss suffered in respect of an asset we would be interested in a replacement cost (RC), the present value of future receipts from its normal use (PV), and the net realizable value, (NRV). It could not cost more than RC to put the deprived owner in his previous financial position, but it would not cost this much if PV or NRV were in fact less than RC. Normally we would expect PV to be higher than NRV but exceptionally this may not be the case.

The six possible combinations of these values are, 1 being the highest:

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)
1	PV	PV	RC	NRV	NRV	RC
2	RC	NRV	PV	PV	RC	NRV
3	NRV	RC	NRV	RC	PV	PV

If it is assumed that the owner wishes to maximise his inflows from the asset the economic value (EV) will be the higher of PV and NRV. In all cases we can delete the lower of PV and NRV since it could not represent a full measure of what had been lost. The combinations thus become:

	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)
1	NV	NV	RC	NRV	NRV	RC
2	RC	RC	NV	RC	RC	NRV

The cost of putting the owner in his original position in terms of monetary equivalence is in all cases except (c) and (f) replacement cost. In those two cases it is PV and NRV respectively, both of which are the economic value.

We will discuss later the objections to using deprival value in a statement of financial position. At this stage we simply say that the use of deprival value for measuring capital used up comes squarely within the context within which it was first formulated. During the productive process the firm has been deprived of some of the potential that originally existed, and it is necessary to restore it in monetary terms to its original position. We say, as it were, that of the cash flows generated some must be repaid to the firm in recompense for the loss it has suffered.

Before looking at the use of the individual values used as a basis for deprival value, it should be noted that, although in fact the basis in only one case, present value is actually used in every case to establish a final deprival value. Deprival value might therefore be considered too subjective for reporting to parties external to the company. It is considered, however, that the more objective market values which must bound present value would act so as to continually enforce more realism in the making of these subjective estimates.

Replacement cost

Replacement cost is the most common measure of deprival value. The effect of its application, on the basis of revaluing opening deprival value, can be seen by reworking Example 1 on the assumption that replacement cost is always the deprival value.

Example 2

Depreciation for each of the three periods is measured as follows:

	Periods					
	$t_0 - t_1$		$t_1 - t_2$		$t_2 - t_3$	
Opening value		90		70		45
Revalued to	1×105	105	2/3×135	90	1/3×150	50
Depreciation	1/3	35	1/2	45	1	50
Closing value		70		45		50

Income for each of the three periods now becomes:

	Periods			*Total*
	$t_0 - t_1$	$t_1 - t_2$	$t_2 - t_3$	t_3
Net cash inflows	60	70	75	205
Depreciation	35	45	50	130
Income	25	25	25	75

The gain on revaluation is not income but is a capital maintenance adjustment.

The objection raised by Gray and Wells, and others, to measuring depreciation in this way is that it assumes that a company will go on doing in the future what it has done in the past, and will in fact replace its assets. Against this we would point out what this method of capital maintenance *does not* achieve. The example shows that we have not maintained capital to such an extent that at the end of the life of the machine (the long term) a new one could be purchased. Instead, the *opportunity* is given at the end of each accounting period (the short term) to reinvest in the same service potential as has just been used up, *if* this is the company's policy. The choice as to whether the company wants to retain its original productive potential is left open. In fact it is quite probable that it will choose to invest the cash inflows thus retained in some other way. If it does it will presumably do so in a way which is more advantageous than reinvesting in the potential used up. In any event, therefore, by measuring consumption of capital in replacement cost terms we will have a measure of income which enables a company to at least maintain the service potential on which rests its prospect for future cash flows. This is the position described by Dewey, where the maintenance of capital 'is secured by using an existing set of specialised assets, not to perpetuate themselves *ad infinitum*, but to create a different and better set.'[10]

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[9] Bonbright, J. C., *The Valuation of Property*, McGraw Hill, 1937.

There are occasions where economically it makes no sense to even consider maintaining productive potential. That situation is where the economic value of the potential is less than its replacement cost, and this is the very case catered for by the deprival value concept.

Present use value

In measuring consumption where present use value is the basis for both opening and closing deprival value the procedure is even more akin to the Hicksian measurement of *ex post* income. The opening PV is revalued on the basis of knowledge at the end of the period, and depreciation is measured as the difference between the newly valued opening PV and the closing one. Income from the asset will be equivalent to the discount rate as applied to the new opening value, that is the actual receipts less depreciation. For a period $t_3 - t_4$ depreciation would be measured as

$$PV_3^4 - PV_4^4$$

and income as: $R_4^4 - (PV_3^4 - PV_4^4)$

or in Hicksian terms as: $R_4^4 + (C_4^4 - C_3^4)$

More problematic is the treatment of the change on revaluation $PV_3^4 > PV_3^3$. The difficulty here is that revaluation at t_3 also presupposes changes in PV back to t_0 and thus possibly necessitates adjustment to previous deprival values and, therefore, previous depreciation and income measures. The answer is to establish a new value for PV at the time that, in the light of knowledge at t_4, it should first have been used as the basis for deprival value, and measure the depreciation from then until the beginning of the period under review. Comparison between that measure and depreciation actually charged will give the amount to be included in the current period's reported income as a prior period income adjustment. That prior period adjustment together with a capital maintenance adjustment (necessary to bring original PV maintained into line with current knowledge) will account for the change on revaluation $PV_3^4 - PV_3^3$.

Thus, if we assume PV to be the base value for deprival value as far back as t_1 and we are measuring income for the period $t_3 - t_4$; the following holds:

Depreciation to t_3 will have been: $PV_3^3 - PV_1^3$

Revised depreciation to t_3 will be: $PV_3^4 - PV_1^4$

The prior year adjustment recorded in the period $t_3 - t_4$ will be: $(PV_3^4 - PV_1^4) - (PV_3^3 - PV_1^3)$

The capital maintenance adjustment will be: $PV_1^4 - PV_1^3$

The prior year and capital maintenance adjustment: $(PV_3^4 - PV_1^4) - (PV_3^3 - PV_1^3) + (PV_1^4 - PV_1^3)$ equal the change on revaluation: $PV_3^4 - PV_3^3$.

Net realizable value

It must be remembered that net realizable value is only used where it takes over from present use value as the real economic value of an asset. Thus even where NRV is both the opening and closing basis for deprival value any change in the value does not necessarily constitute income. Since the change is essentially a change in the economic value of the asset it will constitute part capital maintenance and/or prior year adjustment and only part income.

Example 3

Assume an interest rate of 10 per cent

NRV at t_5 4000

NRV at t_6 5000

Immediate sale at t_5 would be assumed since this was the EV of an expected inflow at t_5. If, however, the asset is held until t_6 it becomes clear in the light of knowledge at t_6 that the true EV at t_5 (EV_5^6) was 4,545. The change in valuation of 545 would be allocated between a capital maintenance adjustment and prior year adjustment as appropriate. Income for the period $t_5 - t_6$ would therefore be only 455, that is the discount rate as applied to the new opening valuation EV_5^6.

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[10] Dewey, D., *Modern Capital Theory*, Columbia University Press, 1965, p. 30.

The resultant income measure

In summary we have suggested that income should be measured by charging against the cash inflows a measure of consumption which ensures that capital is maintained. The basis used for this consumption measure is the deprival value at the date of consumption. Technically this involves revaluing the opening capital on the basis of the deprival value at the date of consumption. Normally the basis of deprival value will be replacement cost and the change on revaluation will represent nothing but an adjustment to the monetary equivalent of the capital maintained. However, it may be that new knowledge results in a different series of prior economic values (the higher of PV or NRV), and thus possibly different prior deprival values. In this case capital is effectively maintained at the economic value relevant to the time at which it, as opposed to replacement cost, first became the basis for deprival value. The change on revaluation will in part be a capital maintenance adjustment, and in part a prior year depreciation adjustment, the latter being included as a separate item in the income statement of the period under review. In all cases[11] the measure of consumption will be found by comparing the opening but newly calculated deprival value with the closing one.

The net income thus reported is a measure of cash which, if the company continued in its present activities, and if the same level of cash inflows were generated and if prices stayed stable, would be distributable in this period and into the future. These are the very assumptions inherent in historic cost accounting. However, we can learn more than this. If we are told the discount rate used by management and the closing deprival value (in total without any analysis) of the company's capital we can ascertain the minimum future income expected by management. Every deprival value involves the calculation of the economic value, that is the future net cash flows discounted back. Where EV is the basis for deprival value it anticipates a future income at a rate equal to the discount rate on that EV. Where RC is the basis for deprival value it must be less than EV and therefore anticipate a future income at a rate at least equal to the discount rate on RC.

In view of the reliance on EV it may be argued that both the current and anticipated measures of income are based on uncertain predictions. This is indeed so, but this is inherent in any income concept which has at its heart the notion of maintaining a future prospect. Hicks' *ex post* income we saw to be dependent on a prospect of future flows; historic cost assumes the prospect of being able to match cost with future revenues; net realizable value relies on the prospect of being able to reinvest at a given rate of interest or otherwise make future purchases at current prices. In short it is a fallacy to think that an *ex post* measure of income involves certainty. What it can possibly involve is a higher level of verifiability, and that is a question of evidence and not certainty.

In using economic value we are always bounded by the more objective market values. Further such estimates as are involved must be limited to the anticipated lives of consumption capital and as such within the normal planning horizon of the firm.

Financial position

In conclusion we will look at the relevance of the deprival value concept to a statement of financial position. In part we do this because the main force of Gray and Wells' argument is directed at the planning decision; in part because traditionally the output of the accounting system involves an integrated profit and loss account and balance sheet; but primarily because we consider that a statement of current financial position can present useful information with regard to investor decision making.

The primary consideration is that the information communicated through a statement of financial position should be useful to the receivers. Traditionally the output of the accounting system is an integrated income and financial position statement. Consequently the basis of valuation used in measuring the consumption of capital is also used in stating the resources owned. However this position is only tenable if the information thereby produced is in fact useful; it is not sufficient that the nature of the system decrees such an articulated output.

Financial position is usually viewed in terms of resources owned by the entity on the one hand, and interests in those resources on the other hand, with expression of the position being in some monetary equivalence. Financial position does not imply a valuation of the business, but rather is concerned with information that may enable among other things such a valuation to be made. A business is continually faced with the choice of whether to continue on its present course or change direction, either totally or in part. Information with regard to both present and alternative activities is essential, but the central and constraining factor is the inherent capacity of the entity to adapt. There are of course matters other than financial considerations to be taken into account, but financial adaptability is nevertheless a major constraint. The only relevant monetary equivalent which reflects a company's financial ability to adapt is NRV. The change/no change decision involves a choice between the present use value of the assets owned and the present value of the best alternative. The latter however is determined by the cash available for investment, itself dependent on the NRV of the assets presently owned. Thus by expressing the present maintainable income as a return on assets stated at NRV the lower limit of any alternative use is indicated. It may be argued that the company may adapt by diversifying through expansion rather than by simply changing from one to another activity. In so far as new capital is raised outside the company one of the relevant constraints will be the security available to cover any borrowings, and this too is indicated by NRV of resources in possession. The investor is thus generally informed as to the prospect of the company optimising its future income in the light of new opportunities.

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[11] This applies equally to short term net cash holdings whose service potential is purchasing power. In this case the adjustment necessary to maintain the purchasing power will be a normal capital maintenance adjustment, but the matching revaluation will be through a charge against income for a loss on holding money.

We would therefore support the view of Gray and Wells, and of course Chambers, that NRV is the only relevant value with regard to the balance sheet. However, we do not accept the argument that it is relevant to *ex post* income calculation (even though it is the only consistent basis of valuation if integrated income and financial position statements are required).[12] Primarily this is because such a measure has no predictive quality. This is evident in the extreme case of the non-vendible asset, the highly specialised asset which always has a low realisation value relative to its cost. We would be unwilling to regard the immediate loss of value as a reduction in income when there is no corresponding reduction in service potential and thus earnings expectations. As Chambers himself admits, 'the mere fact that the resale price of A (an asset) is zero has no necessary effect on the firm's income expectations'.[13] Further such a measure is based on the concept of capital as a fund of purchasing power rather than productive potential, a concept which seems largely irrelevant to an economy based essentially on the managed interaction of capital and labour in production.

Finally, would the use of deprival value as a monetary equivalent in the balance sheet provide any useful information? It must be emphasised that deprival value and value to owner are not synonymous. The first is applicable to an owner who has lost an asset and measures the quantum of the loss; the second applies to an owner in possession of an asset and, assuming rational economic behaviour, would be the present value of the asset in its present use. In short the concept of deprival value was not developed in, nor is it applicable to, the context of valuing assets owned. Moreover, it is difficult to see in what way the use of deprival value would disclose any economically relevant characteristics of business assets. In all but two of the six possible combinations deprival value is completely irrelevant to any immediate decision that may be made concerning those assets. At best all that a financial position statement with assets stated at deprival value tells us is what it would cost another company in resources to have the same opportunity of generating a similar level of income through similar productive processes.

Our conclusion, therefore, is that while deprival value may properly and usefully be used in measuring income, it is an abuse of the concept to use it in a balance sheet. That this conclusion suggests income and financial position statements which are not inter-dependent need not invalidate its use in income measurement. Accounting information should be determined by the needs of the users and not by the structure of the system, and should be judged accordingly. On that basis it is argued that investors should receive (among other things) an income statement in which consumption of capital is measured by reference to deprival value, and a statement of financial position in which the company's resources are stated at their net realizable value.

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[12] i.e. within our context. The Hicksian concept of income as a standard flow would also provide integrated statements with the balance sheet showing the net present value of the firm.

[13] Chambers, R. J., 'Second Thoughts on Continuously Contemporary Accounting,' *Abacus*, Vol. 6, No. 1, September, 1970, p. 47.

Statements of Company Prospects

Susan Dev

The object of the study on which this paper is based was to examine the nature of the information on future prospects contained in the Annual Report and Accounts[1] of companies quoted on The Stock Exchange.

Investors, and others interested in company performance, are generally more concerned with future prospects than with past achievements. It therefore does not seem unreasonable to suppose that they might find information on future prospects helpful, particularly if provided by those who are responsible for making plans for the company and in directing its operations.

When a company seeks a listing for its shares or when it makes a takeover bid, or is involved in a merger transaction, its directors are expected to provide detailed information on its prospects, including a forecast of profits, and there are rules and guidelines concerning the information to be supplied.[2] Indeed, if detailed information is not supplied on such occasions, the fact may well attract the attention of the financial press and others.[3] As part of the normal reporting procedure, however, there appears to be virtually no outside pressure on British companies to give detailed information on their prospects although the matter has attracted the attention of some academics.[4]

The study

The study was based on an examination of the Annual Reports of two groups of 212 companies which will be described respectively as 'newly-quoted' and 'large'. The companies in the first group all made profit forecasts in prospectuses published in 1968 or 1969 at the time of seeking listings for their shares. The Annual Reports examined were those that contained the results of the periods covered by the profit forecasts. Consequently, the information on prospects contained therein referred to the year following the profit forecast and, in some cases, later years. The reason for selecting this group of companies was that the Annual Reports were readily available, having formed the basis of two earlier investigations of a different nature.[5] The other group comprised the 1972 Annual Reports of the 212 largest U.K. industrial quoted companies, the criterion of size being the balance sheet values of their capitals employed.[6] The samples are of the same size for ease of comparing the findings.

Each Annual Report was examined for the information it contained on prospects both for the current year and further ahead. The information was then analysed into a number of categories which are explained in the Appendix to this paper.

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[1] Hereafter this document will be referred to as the Annual Report.

[2] See The Stock Exchange, *Admission of Securities to Listing*, London, 1973, 78–79 and 141–142; *The City Code on Take-overs and Mergers*, London, 1969, para. 15, and practice note No. 6, and also the Institute of Chartered Accountants in England and Wales, *Accountants' reports on profit forecasts*, Statement S 15.

[3] For example, the Parliamentary Papers report that on 25 July 1972 Dr. John Gilbert, M.P. 'asked the Secretary of State for Trade and Industry if he will institute an inquiry into the circumstances surrounding the raising by Mothercare Limited of £13 million on the London Stock Exchange without any profits forecast being published'.

[4] See, for example, H. C. Edey, 'Accounting Principles and Business Reality', in B. V. Carsberg and H. C. Edey (eds.), *Modern Financial Management*, London, 1969, 30; Peter Bird, *Accountability: Standards in Financial Reporting*, London, 1973, 46–48 and also Susan Dev, 'Mergers and Shareholders', in J. M. Samuels (ed.) *Readings on Mergers and Takeovers*, London, 1972, 163–168.

[5] See Susan Dev and Michael Webb, 'The Accuracy of Company Profit Forecasts', *Journal of Business Finance*, Vol. 4, No. 3 (1972), 26–39 and Susan Dev, 'Problems in Interpreting Prospectus Profit Forecasts', *Accounting and Business Research*, No. 10 (1973), 110–116.

[6] The names of these companies were taken from *The Times 1000 Leading Companies in Britain and Overseas 1972–73*, London, 1972. Two companies belonged to both groups but were excluded from the second.

If an indication of prospects was supplied, it invariably appeared in the informal statement signed by the Chairman and known as the Chairman's Statement, Chairman's Speech or Chairman's Review. Table 1 shows that, for 21 companies, the statement was in a separate document from the Annual Report. In a few of these cases, apparently both were sent to shareholders at the same time. More usually, however, the statement was an account of the speech given by the Chairman at the Annual General Meeting, copies being available on request afterwards. Sometimes the speech was reproduced in full in the financial press soon after the meeting. The Chairman's statement is not given statutory recognition so there is no obligation for a copy to be filed with the Registrar of Companies. It seems likely that, in some cases, the Chairman's views on the prospects of his company are not readily obtainable except by writing to the company for a copy of his speech. Table 1 also shows that 6 companies do not appear to have published a Chairman's statement at all[7] and none was reported in *The Financial Times*. For 397 companies, the Chairman's statement formed an integral part of the Annual Report.

An analysis of the information on prospects is given in Tables 2 and 3 which are summarised in Table 4. The analysis takes into account the general tone of each Chairman's comments, including his remarks on the past year's profits as compared with the preceding year's, as well as his explicit reference to future prospects, if any. The short extracts given

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[7] The Secretaries, or Registrars, of these 6 companies either failed to reply to my letter or told me that no statement was available.

TABLE 1
Location of Chairman's statement

Classification of company / Location of statement	Newly-quoted	Large	Total
	Number of companies		
No statement	4	2	6
Separate document	2	19	21
In annual report	206	191	397
Total	212	212	424

TABLE 2
Comments on prospects for 212 newly-quoted companies

Longer-term prospects / Profits for current year	8 No mention	9 Conditional	10 Good/poor	Total (profits for current year)
	Number of companies			
1[1] No mention	19	2	3	24
2 Too difficult to forecast	39	1	9	49
3 Much higher/lower	8		2	10
4 Higher/lower	56		23	79
5 A little higher/lower	19	1	2	22
6 Similar to last year	10	2	1	13
7 Not less than £x	14		1	15
Total (longer-term prospects)	165	6	41	212

1 Row and column numbers refer to explanations in the Appendix

TABLE 3
Comments on prospects for 212 large companies

Longer-term prospects / Profits for current year	8 No mention	9 Conditional	10 Good/poor	Total (profits for current year)
	Number of companies			
1 [1] No mention	14	7	3	24
2 Too difficult to forecast	27	7	5	39
3 Much higher/lower	11		8	19
4 Higher/lower	49	6	33	88
5 A little higher/lower	16	5	7	28
6 Similar to last year	8	2	1	11
7 Not less than £x	1		2	3
Total (longer-term prospects)	126	27	59	212

[1] See Table 2 for references

TABLE 4
Comments on prospects for all 424 companies

Longer-term prospects / Profits for current year	8 No mention	9 Conditional	10 Good/poor	Total (profits for current year)
	Number of companies			
1 [1] No mention	33	9	6	48
2 Too difficult to forecast	66	8	14	88
3 Much higher/lower	19		10	29
4 Higher/lower	105	6	56	167
5 A little higher/lower	35	6	9	50
6 Similar to last year	18	4	2	24
7 Not less than £x	15		3	18
Total (longer-term prospects)	291	33	100	424

[1] See Table 2 for references

in the Appendix indicate that the analysis is highly subjective, for the comments of the Chairmen tended to be rather imprecise. In particular, the differences between categories 3, 4, 5 and 6 are not as clear-cut as the tables imply.

Table 4 indicates that 48 (13%) Chairmen made no comments concerning expected profits for the current year. In a further 88 (21%) cases it appears that the profits of the current year were rather difficult to forecast. Either this was explicity mentioned or the comments were found to be too imprecise to draw any conclusions as to their import. The Chairmen of 270 (64%) companies used various expressions to indicate the extent by which profits were expected to differ from those of the past year. For a reader of the Annual Report to quantify the expected differences reasonably accurately would, no doubt, be a very difficult task. The remaining 18 (2%) Chairmen gave profit forecasts which were mostly of the form that 'profits will be not less than £x'.

As far as the longer-term is concerned, the Chairmen of 291 (69%) companies made no reference at all to prospects. The other 133 (31%) indicated in general terms that prospects for growth were good (or, occasionally, poor) but, for 33 of these, this was conditional on the economic situation of the country, or of the particular industry, improving.

If a company publishes profit forecasts regularly, a knowledge of their accuracy in the past might be considered helpful in interpreting forecasts relating to future periods. Consequently, the recent Annual Reports of the 15 newly-quoted companies that made specific forecasts in the year of study (Table 2 row 7) were examined to see whether the publication of profit forecasts has since become a regular practice and, if so, how they have compared with subsequent reported results. It is possible that a similar examination could be carried out for cases where a Chairman's comments are easily quantifiable. As already implied, however, there are very few such instances amongst the companies in the two groups so the matter was not pursued.

Table 5 shows that, of the 15 companies that made forecasts before going public and also in the following year, only two have since published profit forecasts in their Annual Reports. Including the prospectus forecast, one company (no. 14) has published forecasts for five years.[8] Investors interested in company 14 might well find its forecasts a helpful guide to eventual results if they were to examine the ratios in the Table for they have not, in general, varied widely from year to year. There are insufficient ratios available to give a clear indication of the forecasting accuracy experienced by the other companies over a period of time. One can, however, observe that the variability between the ratios for years 1 and 2 is slight for some companies but quite substantial for others.

Concluding comments

This study has indicated that the information provided by many companies on future prospects tends to be imprecise and not to extend beyond the current year, part of which has already elapsed by the time the Chairman's remarks are published. The choice of adverbs and adjectives to describe prospects is inevitably influenced by the Chairman's mode of speech and, hence, interpretation is bound to be highly subjective.

TABLE 5
Ratios of actual to forecast profits before corporation tax for 15 newly-quoted companies (a)

Year of forecast Company ref. no.	1	2	3	4	5	6
	Ratio of actual to forecast profit					
1	1·94	1·20	*	*	*	*
2	1·50	0·84	*	*	*	
3	1·44	(b)				
4	1·39	1·37	*	*	*	
5	1·36	1·07	*	*	*	
6	1·16	0·71	*	*	*	*
7	1·11	1·44	*	*	*	*
8	1·10	1·03	*	*	(c)	
9	1·09	1·38	*	*	*	*
10	1·08	1·11	*	*	*	(c)
11	1·08	1·06	*	*	*	*
12	1·04	1·02	*	1·25	1·20	*
13	1·04	0·63	*	*	*	*
14	1·03	1·10	1·15	1·12	1·31	*
15	1·00	0·57	*	*	*	*

(a) See text. These companies made prospectus forecasts in either 1968 or 1969 (year 1) and forecasts in the year of study (year 2) – see Table 2 row 7.

(b) Forecast published but company taken over and separate results not disclosed.

(c) Taken over, or merged with another company, in this year and no forecast published in the Annual Report.

* No forecast included in the Annual Report.

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[8] Of the 3 large companies in row 7 of Table 3, only one included a profit forecast in its 1973 Annual Report.

A comparison of the figures in Tables 2 and 3 indicates that large companies are possibly more inclined to make references to prospects further ahead than newcomers to the market but not in precise terms. Also, newcomers appear to be more likely to publish specific forecasts in their first Annual Reports as public companies than large companies whose shares have been quoted for some time. However, Table 5 indicates that this is not likely to become a regular practice.

There does not seem to be a marked difference between the usefulness of the information provided by the two groups nor does there appear to be a good reason why these findings might not be typical of quoted companies in general. This is unfortunate. The investor is interested in company prospects yet he is normally provided with very little information from those who are in the best position to provide it.

Appendix

Classifications of Prospects used in Tables 2, 3 and 4.

Profits for the current year

1. No mention

This category includes the six companies that did not publish a Chairman's statement (see Table 1). Prospects were not mentioned elsewhere in the Annual Report nor in *The Financial Times* at the time the year's results were announced or following the Annual General Meeting.

The Chairmen of the other companies reviewed operations of the past year but gave no hint concerning prospects for the current year.

2. Too difficult to forecast

Comments on prospects that tended to be too imprecise to classify elsewhere were placed in this category.

Specimen wordings:

'There are both advantageous and disadvantageous factors at work and no quantitative evaluation can be conscientiously made'.

'It is too early for me to forecast profits for the current year'.

Depending on the context in which they were given, expressions such as 'we will try hard', prospects are 'encouraging' or 'reasonable' are also included in this category.

3. Much higher/lower

Specimen wordings:

'Profit will be substantially in excess of the figure achieved in 1969'.

'1972 will be a very much better year than 1971'.

4. Higher/lower

Specimen wordings:

'I expect a further increase in turnover and profit for the year'.

'I must expect some further falling off in the Group net profit'.

5. A little higher/lower

Specimen wordings:

'It is unlikely that the profits this year will show any substantial increase'.

'Profit for the current year may be marginally reduced'.

6. Similar to last year

Specimen wording:

'I do not expect our profits to be widely different from the past year'.

7. Not less than £x

This category includes all forecasts of a stated amount. Almost all were of the form 'profits will not be less than £x' but a few mentioned that a certain sum was expected to be reached.

Specimen wordings:

'I have no hesitation in forecasting profits of at least £200,000'.

'Profits of the Group before taxation should approach £8m for the current trading year'.

Longer-term prospects

9. Conditional

The comments here invariably indicated that the company's prospects were good if, or when, economic conditions improved.

Specimen wordings:

'When the long-delayed recovery takes place we shall be ready for it'.

'. . . well placed to take advantage of any improvement in trading conditions'.

10. Good/poor

Specimen wordings:

'Your Directors have every confidence that future profit growth will continue at a very satisfactory rate'.

'I look forward to the future with strong and reasoned optimism'.

Financial Information and the Accounting Standards Steering Committee

J. Fisher

Introduction

It is often stated that the importance of audited financial statements as a source of information to certain institutional users of financial statements is considerable. This view was endorsed by the preliminary findings of a research project, to be discussed later in this article, which show that on a world wide basis 89% of respondents to a questionnaire felt that audited financial statements and dated notes were of great to very great importance as sources of information for decision making purposes. Broken down into regional responses 92% of North American respondents ranked such statements as being of great to very great importance, whereas the replies from the European Economic Community and United Kingdom respondents were 83.3% and 88.7% respectively. When further describing what in their opinion was the single most important purpose of financial reports the respondents to the questionnaire put forward various views of which the following quotations are typical:

> 'To give the shareholders a clear account of what has happened to the financial position of the company during the year, and what the directors plan to do during the coming year.'
>
> 'To provide information to shareholders largely via Investment Analysts and Financial Journalists.'
>
> 'To give the investment community a full and fair picture of the company's business, financial conditions, and prospects.'
>
> 'To attempt to analyse the validity of past growth as an indicator for the future.'
>
> 'To provide those interested with an historic-cost based results for a year which they can adjust with supplementary information for their own needs.'

It would therefore appear that although the respondents' individual views are somewhat divergent the corporate financial statements are seen to be utilitarian in nature and in purpose and should therefore be addressed to the informational needs of the external user, who relies thereon and who has little ability or opportunity to obtain particularly relevant information from other sources. This fundamental function of providing useful information as a basis for making economic decisions has been further sub-divided into Pervasive and General Objectives by the Accounting Principles Board of the American Institute of Certified Public Accountants in Statement No. 4 entitled '*Basic Concepts and Accounting Principles underlying Financial Statements of Business Enterprises*'.

The Pervasive Objective is deemed to be the provision of useful information about individual business enterprises to external users, and the general objectives are seen to be five in number namely:

1 To provide reliable financial information about economic resources and obligations of a business enterprise.

2 To provide reliable information about changes in net resources of an enterprise that result from its profit-directed activities.

3 To provide financial information that assists in estimating the earnings potential of the enterprise.

4 To provide other needed information about changes in economic resources and obligations.

5 To disclose, to the extent possible, other information related to the financial statements that is relevant to the statement user's needs.

Other international researches into this area of the objectives of financial statements, carried out in the United States by the Study Group led by Robert M. Trueblood, and in Australia by W. J. Kenley and G. J. Staubus on behalf of the Accountancy Research Foundation, have also arrived at a similar grouping of objectives of financial statements revolving around the need to fulfil the information needs of both the private and public sectors of the economy thus assisting in a more efficient allocation of scarce resources and contributing to the attainment of broad economic goals.

Unfortunately this wide ranging conceptual approach has not been evident in the European Economic Community or United Kingdom pronouncements which still seem to view the horizons of accounting as being bounded by the restricting influence of practical acceptability, the powerful influences of legal requirements and of realisation, as well as the rigid application of such relative concepts as truth and fairness. This seeming acceptance of present practice is accentuated when we compare the workings, pronouncements and findings of the Accounting Standards Steering Committee with the Trueblood Study Group pronouncements on such areas as Earnings Cycles; forecasts; communication in single numbers and ranges; and the need for a statement of financial activities to disclose those activities which have significant cash consequences. Perhaps an overall criticism of the present programme of the Accounting Standards Steering Committee is that it appears to accept the narrow view of a business entity governed by legal regulatory influences rather than that of an enterprise acutely aware of its social responsibilities and the relationship of enterprise goals to social goals. When one examines the origins, procedures, programme and actions of the Committee over the last four years one wonders if any future change in emphasis or orientation will develop, or if the information needs of external users of financial statements will be considered together with their views and observations, and incorporated into standards of accounting practice where this is deemed to be both desirable and feasible.

Accounting Standards Steering Committee

The main cause of such a narrow viewpoint may in fact lie in the Statement of Intent 'Accounting Standards in the 1970's made in December 1969, the implementation of which necessitated the formation of the Accounting Standards Steering Committee in January 1970. The main thrust of the statement was 'to narrow the areas of difference and variety in accounting practice by publishing authoritative statements on best accounting practice which will wherever possible be definitive'.[1]

This however seems to be based on both administrative expediency and the practical operating needs of management and fails to suggest any awareness of the effects which such a body of pronouncements could have both on the evolution of financial reporting and on the reactions of the users of financial information outside the business enterprise.

The membership structure of the ASSC does not in any way add the necessary breadth as the membership of 21 is made up of 12 representatives from the Institute of Chartered Accountants in England and Wales;

3 representatives from the Institute of Chartered Accountants of Scotland;

2 representatives from the Institute of Chartered Accountants of Ireland;

2 representatives from the Association of Certified Accountants; and

2 representatives from the Institute of Cost and Management Accountants.

Granted the Accounting Standards Steering Committee has formed and periodically consulted a liaison group of representative bodies concerned with financial reporting, amongst which are the Confederation of British Industries; Stock Exchange; Society of Investment Analysts; and Take-over Panel, but when all is finally said and done such consultations can only be on request and the findings therefrom need not necessarily be given the importance they deserve. This can be evidenced in each exposure draft which has appeared without a full exposition of the minority views held by members of the committee or the working party.

It is not suggested that the members of the Accounting Standards Steering Committee act in an unprofessional and cavalier fashion, in fact the exact opposite is no doubt the case; it is however suggested that just as in many other seemingly democratic and egalitarian structures the composition of the final policy and decision making group may override the wishes and intentions of the working parties and liaison groups.

A further basic criticism of the workings of the Accounting Standards Steering Committee is in respect of the 20 point programme which was agreed in April 1970 with indications that it would take at least five years to complete. In the period from January 1974 to date the following documents have been published by the Accounting Standards Steering Committee:

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[1] Accounting Standards Steering Committee – "Statement of Intent" – *Accountancy* – December 1966.

Explanatory Foreword	1
Accounting Standards	6
Exposure Drafts	13
Discussion Papers	2
Provisional Standards	1
	23

and with the exception of Standard No. 1 which took 6 months to progress from an exposure draft to a standard all other standards have taken on average 18 months or more with those controversial issues involving an even greater period of time. The major reason for such a considerable time-lag would appear to be initially one of resources, and lack of both sufficient finance and manpower. It is submitted that if other interested bodies were incorporated into the committee on a full participating membership basis these deficiencies could in some way be overcome, especially that relating to personnel.

The whole question of the usefulness of financial statements as a means of communication is too important an area to be left entirely in the hands of the accountancy profession and a more broadly based committee comprised of both the preparers of financial statements and the users of such communications, with public hearings where necessary would no doubt lead to a more thorough and timely consideration of all aspects of basic financial reporting. It would also necessitate a review of the present programme which must surely over the past four and a half years have required some modification and updating, especially as regards an examination of topic number 18 dealing with the fundamental objectives and principles of financial statements, which is still after four years only at the research study stage. Once the Accounting Standards Steering Committee authoritatively sets out the objectives and purposes of financial statements then the basic concepts could be established and the practices and rules could be determined on the basis of the principles involved. This would give a logical and systematic framework of accounting theory which it is hoped could then be utilised in those areas not at present covered by specific standards.

Basic Objectives

As stated earlier accounting is utilitarian in purpose and like all other professions has as a basis service to people, and the fundamental objective of financial accounting must be the provision of financial information to assist decision making.

The information contained in financial statements must be such that it can satisfy the needs of such decision makers and various criteria have in the past been used in evaluating useful information.

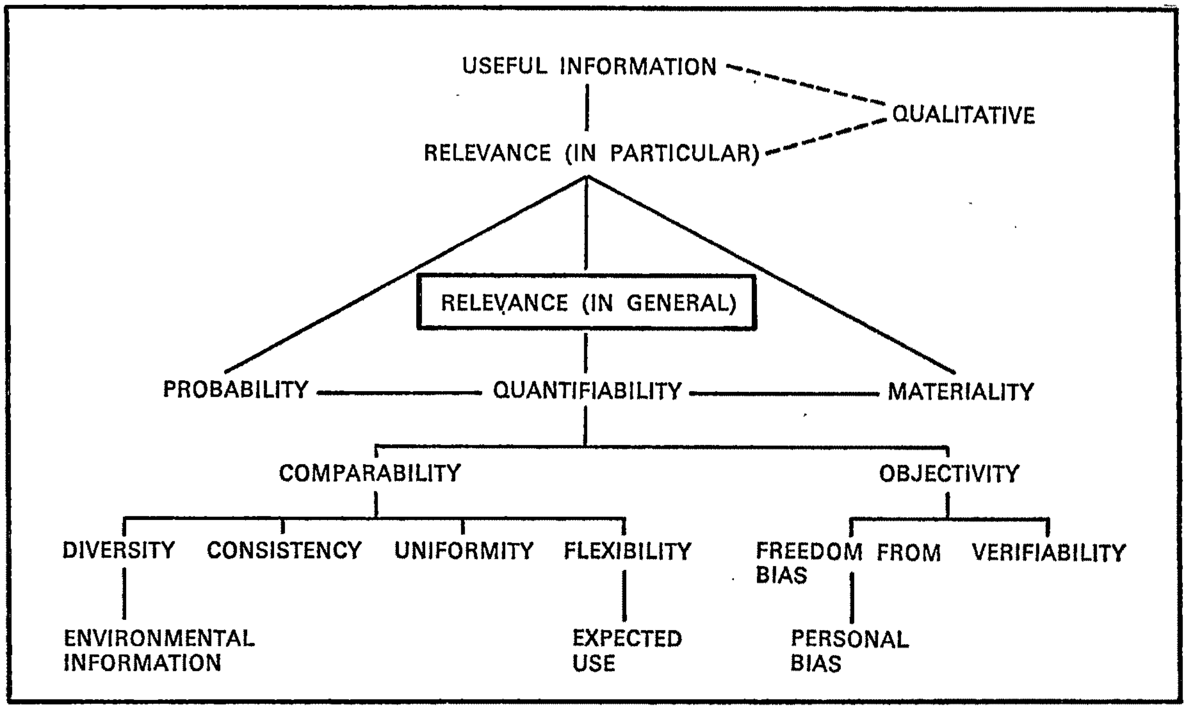
The Trueblood Study Group described such criteria as 'qualitative characteristics of reporting and suggested them to be Understandability, Consistency, Comparability, Freedom from Bias, Reliability, Form and Substance, and Relevance and Materiality. The American Accounting Association's Statement of Basic Accounting Theory on the other hand describes the criteria as 'standards' and lists them together with guidances as Relevance, Verifiability, Freedom from Bias, and Quantifiability. It is however this writer's contention that the dominant criteria for evaluating useful information should be not merely relevant information, but information 'relevant in particular' which is purposeful and pertinent to the matter in hand and allows the decision maker to use it as desired in whatever way he or she thinks necessary. The inter-relationship between the various suggestions and guidelines above can perhaps be best presented in the diagrammatic form shown overleaf.

Relevance is of course unable to be separated from the concept of purposeful financial information as any information which is not relevant is obviously not useful regardless of its other characteristics.

Unfortunately the users' needs for financial information are not known with any degree of certainty nor has the specific role of financial statements been identified due in the main to the lack of direct feedback from the users of financial statements. Although each recipient of financial statements is connected with the business enterprise they have very little formal contact one with another, and therefore their ability to reach any degree of consensus concerning either the enterprise or the language of accounting is greatly diminished. Greater consideration must therefore be given to an understanding of these difficulties and to ascertaining the information needs of the users – and it was with these thoughts in mind that the following integrated multi-subject study was tackled.

Nature of the Study

The independent study was carried out with financial assistance from the Winston Churchill Memorial Trust which awarded the writer a Travelling Fellowship to study corporate financial reporting and techniques in North America and Europe. The main method of obtaining information was by questionnaire and informal interviews. In the case of the European samples each questionnaire and introductory letter was prepared in the language of the potential respondent. The bulk of the research effort has been directed to the development, distribution and interpretation of the questionnaire, and



to the conducting of interviews.

The questionnaire was directed to a broad sample of external users of corporate financial statements in order to obtain from them an indication of their needs for financial information. It was decided that rather than attempt the ambitious task of examining the views of all external users focus should be directed primarily towards the consultative group of direct and indirect institutional users whose function it is to assist or protect direct users. Members of the control, lending and analytical groups were also requested to participate to obtain a broader view and as a result the questionnaires and interviews involved Bankers; Financial Executives; Financial Analysts; Insurance Company Executives; Stock Exchange Dealers and Brokers; Accountants; Academics/Educationalists, and a miscellaneous category.

The survey was conducted in North America, Europe, and the United Kingdom. Two hundred questionnaires were sent to potential respondents in each location in the following percentages:

Sample

Designation	%
Bankers	20
Financial Executives	5
Financial Analysts	20
Insurance Company Executives	20
Stock Exchange – Dealers and Brokers	20
Accountants	10
Academics/Educationalists	4
Others	1
	100

In all six hundred questionnaires were sent to a reasonably diversified cross section of external users resulting in two-hundred and forty-five replies or a 40.83% response rate, made up as follows:

Location	*Replies*	%
North America	114	57
Europe	78	39
United Kingdom	53	26.5

It is not claimed that the views expressed by the respondents necessarily agree with those of other members of similar groups who were not requested to participate in the study or of those who did not reply to the questionnaire. It is however suggested that as the respondents were sufficiently interested in this area of inquiry to reply, their views should be accepted and note made of the various areas of consensus that have become apparent.

The pretested questionnaire used in the study was subdivided into five specific sections covering:

I Investment Policy
II Usefulness of Financial Reports

III Accounting for Changing Money Values
IV Multiple Measurement in Financial Statements
V Background

Certain questions were presented in such a way that a 'yes' or 'no' answer was sufficient, but where the respondent wished to add further information, additional space was provided and they could elaborate on their answers on a separate sheet if they so wished. Where the respondents were asked to apply relative importance ratings to the various items their opinions were recorded on the following five point scale.

Point Value	*Importance Scale*
1	No importance
2	Little importance
3	Some importance
4	Great importance
5	Very great importance

Questions requiring indications of agreement or disagreement were again ranked on a five-point scale.

Point Value	*Agreement Scale*
1	Strongly disagree
2	Disagree
3	Undecided
4	Agree
5	Strongly agree

and opinions of usefulness, and acceptability were ranked on a three-point scale.

Points	*Usefulness Scale*	*Acceptability Scale*
1	Not useful	Not acceptable
2	Useful	Acceptable
3	Extremely useful	Very acceptable

Financial Reports

The main areas of interest in this paper surround questions in parts II and IV involving Financial Reports and Multiple Measurement in Financial Statements. Whilst preparing and pretesting the questionnaire it became evident that differences of opinion would arise as regards terminology and the following are some of the working definitions used throughout the study.

1. *Historic Cost* – Cost to the present owner at the time of acquisition.
2. *Current Replacement Cost* – The cost at current prices that would have to be paid to replace an asset or group of assets, capable of providing services equivalent to those currently expected from the asset.
3. *Net Present Value* – This is conceptually the amount of future net cash flows generated by the asset, discounted to their present value by interest and profitability factors.
4. *Net Realisable Value* – (Current Cash Equivalent) – The value of an asset to an entity in exchange. That is the cash which the entity can obtain from the sale of an asset in order to further an alternative goal.
5. *Reproduction Cost* – The cost today to produce an asset identical to the one held by the entity.
6. *Opportunity Cost* – The cost of an action expressed in terms of foregone alternatives.
7. *General Price-Level Adjustment* – The restatement of the historic cost of assets, liabilities, revenues and expenses in the financial statements by means of a general price-level index, which reflects changes in the purchasing power of money over all goods and services.
8. *Entity* – The specific business enterprise identified in the financial statements.
9. *Source and Application of Funds Statement* – Statement prepared to report the flow of net quick assets through an entity for a period of time. Net quick assets are considered to be cash and bank balances, marketable securities, and receivables less current liabilities.

Findings and Implications

During late 1973 and early 1974 when the completed questionnaires were received they were coded and the information thereon was punched into tabulating cards, and the data were processed by the Edinburgh Regional Computer Centre. Considerable use was made of the Statistical Package for Social Sciences (SPSS) programme as well as a programme developed in conjunction with Mr. Ian Whittaker, of the Department of Computer Science at Heriot-Watt University, Edinburgh. The written views and comments of the various respondents to open-ended questions or in letters and conversations were also carefully classified and evaluated.

The interpretation of the findings is based on the arithmetic mean response and its standard deviation, and the mean was calculated in order to give a single figure which summarises the responses and allows comparison of the degrees of importance attached to each question by the various respondents. Thus from the aforementioned scales an importance factor of between 4 and 5 may be considered to cover Great to Very Great Importance and a reply from 1 to 2 would be considered to be Little or No Importance. As is explained in an article on a similar study into the Information Needs of Individual Investors,[2] the arithmetic mean does not adequately reveal the diversity of opinion among the respondents pertaining to the usefulness or importance of a particular factor. Other statistical tests including chi-squared tests have been carried out in this area but the following findings include only the co-efficient of variation in order to reflect the differences of opinion, with larger co-efficients reflecting greater differences among the respondents.

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[2] Baker H. K. and Haslem J. A. – Information Needs of Individual Investors – *The Journal ol Accountancy* – November 1973 – pp. 64-69.

Although the findings for each question have been sub-divided into replies from each class of respondent, and include all the tabulations and statistical tests applied to the total sample, it is intended in this article only to report the results in total form and only for the European and United Kingdom locations. Should any interested party wish further details relating to North America or to any of the individual functional categories these can easily be provided.

The following tables give some idea of the total response to questions pertaining to financial reporting and the replies are grouped on the following location basis:

(*a*) Europe (Sub-file number three covering France, Germany, Belgium, and Holland).

(*b*) United Kingdom (Sub-file number four).

On examining the replies to question 14 in table 2 the obvious importance of audited financial statements and published reports is highlighted both in Europe and the United Kingdom; in addition from question 17(*b*) in table 4 it would appear that although both the European and United Kingdom respondents are not entirely satisfied with the retention of historic costs the United Kingdom respondents are much more prepared to accept this method as a means of reporting. A similar grouping of responses relating to the acceptability of historic cost adjusted by a general price index can be noted from question 13(*b*) in table 2 which also suggests that external users in both locations place great emphasis on the need for information expressed where possible in current replacement cost terms. This is borne out by the replies to question 13(*a*) in table 1 which state that 53.8% and 58.5% of European and United Kingdom respondents would favour financial statements which reported different valuation bases.

In discussions carried out during the study many interviewees although still prepared to accept historic cost information as the primary input of financial reports, suggested that the differing valuation bases could initially be reported by means of supplementary statements.

During discussions dissatisfaction was also expressed in respect of the frequency of reporting, with many respondents in both locations suggesting that reports should be made either twice or four times a year. This is borne out by the findings of question 16(*a*) table 3, and it is interesting to note that the institutional users are well aware of the problems accountants have in preparing such interim reports, and would be prepared to accept broad interim impressions (Q. 16(*b*) table 3). When questioned as to the usefulness of such statements without an auditor's attestation replies show that the institutional users would prefer audited statements. In discussions however this appeared to be an area which they had not fully considered and many, although replying as above, felt that they would prefer to rethink this aspect.

Carrying this question of supplementary statement reporting a stage further a majority of the respondents in both Europe and the United Kingdom are of the opinion that a two tier form of reporting could perhaps be beneficial (Q. 32(*a*) table 4), and that reports giving probabilistic ranges rather than deterministic figures would be deemed to be credible (Q. 30 table 1).

On the question of companies reporting projections of future expectations on a periodic basis, 93.6% of European respondents and 81.1% of United Kingdom respondents felt that the accounting profession should consider incorporating this information into financial reports. As regards the vehicle or vehicles of such a communication the European respondents favoured firstly the directors' report, and secondly published budgets and statements of long range plans. In the United Kingdom however the same vehicles were favoured but the order was reversed.

Another plea which was highlighted in both European and United Kingdom financial centres was for the inclusion of source and application of funds statements in all published reports and the Accounting Standards Steering Committee Exposure Draft No. 13 will no doubt be welcomed by external users of financial reports in this country, if not in Europe.

One wonders however if the seemingly open choice of format as suggested in the exposure draft would prove acceptable when the request for standardised form and terminology as seen in question 32 (*a*) table 4 is considered.

Much has been written in recent months concerning the compatability of thought and action of the European and United Kingdom Accounting professions, with some doubts being expressed as to the depth of such relationships. One thing that has become obvious from this section of the study of financial reporting is the great similarity in response from the users of financial statements in both Europe and the United Kingdom. This covers almost all aspects of section II of the study and includes agreement concerning the importance of the measurement of earning power (Q. 17 (*a*) table 4) as well as seeming uncertainty in both camps as to whether or not management should have freedom to adopt the accounting method which in their opinion is most suitable (Q. 17 (*d*) table 4). Let us hope that with an audience so obviously in agreement we can manage so to order things that the 'dramatis personae' are also in accord one with another.

If the findings of the study are viewed along with recent exposure drafts, provisional standards, and standards there appear to be certain areas where the views of the institutional respondents appear to be somewhat at odds with those of the accounting profession and especially so in respect of Exposure Draft No. 6 on Stock and Work-in-Progress and the Provisional Statement of Standard Accounting Practice No. 7 on Accounting for Changes in Purchasing Power. The main point of contention in both documents concerns the use of replacement cost and the related method of LIFO. Although neither the exposure draft nor the provisional standard favour this approach, there appears to be considerable support by the respondents, and it is suggested that they should be considered both suitable as a means of communicating financial information to external users, and as an area worthy of future consideration and research by the Accounting Standards Steering Committee.

When the accounting treatment and disclosure of government grants as laid down in Statement of Standard Accountancy Practice No. 4 is examined in the light of the replies to questions 15 (*a*), (*b*) and (*c*) (table 1), it would appear that the institutional respondents would favour method (*b*) which treats the amount of the grants as a deferred credit to be transferred to the revenue account in part, on an annual basis. This would be in preference to the other suggested method (*a*) of reducing the cost of acquisition of the fixed asset.

Although much of what has gone before has been critical of the workings of the Accounting Standards Steering Committee all is not gloom and despair. As mentioned earlier in this article the recent publication of exposure draft No. 13 on Sources and Applications of Funds is extremely welcome and timely, and it would appear that Statement of Standard Accounting Practice No. 6 is partly in line with the needs of the institutional respondents in Europe and the United Kingdom as quantified in the answers to questions 15 (*a*), (*b*) and (*c*). The statement requires all extraordinary and prior year items to be accounted for through the profit and loss account for the year, and not through the reserves; and also that the profit and loss account should not include such items as part of the calculation of net income, but show them separately as extraordinary items (less taxation attributable thereto). This final point, although agreed by a majority of both European and United Kingdom respondents, was not at all conclusive as only 52.6% and 50.9% of the European and United Kingdom replies indicated their approval of such a method.

Conclusion

One of the impressions gained during this study, which was confirmed on receipt of the completed questionnaires, was that the institutional users of financial statements do have views concerning such communications and are prepared to record such views to any interested audience. It is therefore suggested that these views and opinions be continually obtained by the Accounting Standards Steering Committee when considering all aspects of financial reporting and communication, and that all views including those of the minority be fully exposed by publication. It is further suggested that access to such views and expertise of the institutional user could be best obtained by inviting those representative bodies represented on the liaison group at present consulted by the Accounting Standards Steering Committee to accept full participating membership of the committee. In tandem with this suggestion of participation would be the consideration of holding public hearings which could be attended by all parties interested in the preparation and use of financial statements, rather than directing their views through the various professional bodies as at present. This facility would continue in existence and be enriched by the inclusion of individual and group comments in both written and oral presentations.

If the above suggestions prove to be either unacceptable or impracticable a closing appeal is that the Accounting Standards Steering Committee quickly complete their deliberations on topic number 18 dealing with the fundamental objects and principles of periodic financial statements and at the same time give some consideration to broadening the Public Statement of Intent to include a desire to establish and improve standards of financial accounting and reporting, and an awareness of the effects such reports have on interested parties outside the business enterprise.

TABLE 1

		Europe				United Kingdom						
		Yes		No		Yes		No				
		No.	%	*No.*	%	*No.*	%	*No.*	%	*Mean*	*Standard deviation*	*Coefficient of variance*
Question 13 (*a*)	Would you favour financial statements which reported different valuation bases?	42	53·8	36	46·2	31	58·5	22	41·5	1·415	0·492	0·348
Question 15 (*a*)	Should extraordinary or non-recurring events be included in the Income Statement?	73	93·6	5	6·4	48	90·6	5	9·4	1·094	0·292	0·267
(*b*)	If so, should they be set out separately?	78	100·0	0	0	51	96·2	2	3·8	1·000	0·194	0·194
(*c*)	Should this presentation be included as part of the calculation of Net Income?	37	47·4	41	52·6	26	49·1	27	50·9	1·471	0·535	0·364
Question 30	Would you accept as credible financial statements which give an indication of the various levels of precision in historical cost say within a range of ± 10%?	32	41·0	46	59·0	24	45·3	29	54·7	1·358	0·647	0·476
Question 31	Should corporations report projections of future expectations on a periodic basis?	73	93·6	5	6·4	43	81·1	10	18·9	1·188	0·391	0·329

TABLE 2

	Europe						United Kingdom								
	Not acceptable		acceptable		Very acceptable		Not acceptable		acceptable		Very acceptable		Mean	Standard deviation	Coefficient of variance
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Question 13 (*b*) Please state the acceptability of each of the bases below															
Current replacement cost	30	38·5	26	33·3	22	28·2	20	37·7	15	28·3	18	34·0	1·660	1·227	0·734
Net realisable value	47	60·2	19	24·4	12	15·4	25	47·2	20	37·7	8	15·1	1·396	1·052	0·753
Net present value	47	60·2	19	24·4	12	15·4	35	66·0	13	24·5	5	9·5	1·150	0·939	0·816
Reproduction cost	46	58·9	24	30·8	8	10·3	31	58·5	21	39·6	1	1·9	1·150	0·855	0·743
Opportunity cost	57	73·1	12	15·4	9	11·5	37	69·8	10	18·9	6	11·3	1·132	0·952	1·434
Historic cost updated by a general price index	46	58·9	22	28·3	10	12·8	24	45·3	20	37·7	9	17·0	1·434	1·073	0·748
	Little or no importance		Some importance		Great to very great importance		Little or no importance		Some importance		Great to very great importance		Mean	Standard deviation	Coefficient of variance
Question 14 Please rate the importance of the following sources of information															
Audited financial statements and related notes	0	0	13	16·7	65	83·3	2	3·8	4	7·5	47	88·7	4·415	0·856	0·194
Other material in the published report	4	5·1	26	33·3	48	61·6	4	7·6	17	32·1	32	60·4	3·679	0·947	0·257
Interviews with company officers	20	25·7	12	15·3	46	59·0	5	9·4	22	41·5	26	49·1	3·641	1·011	0·277

TABLE 3

	Europe				United Kingdom						
	No.	*%*			*No.*	*%*			*Mean*	*Standard deviation*	*Coefficient of variance*
Question 16 (*a*) As an external user of corporate financial reports, how often would you like to receive financial reports?											
Once a year	8	10·4			3	5·7			2·641	0·617	0·233
Twice a year	19	24·7			14	26·4					
Once a quarter	48	62·3			35	66·0					
Once a month	2	2·6			1	1·9					
	Same form		*Broad impression*		*Same form*		*Broad impression*				
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*			
(*b*) Would you wish the additional reports to take the same form as the annual report, or would you be prepared to accept a broad interim impression?	22	28·6	55	71·4	14	26·4	39	73·6	1·735	0·440	0·254
	Yes		*No*		*Yes*		*No*				
(*c*) Would the usefulness of these additional statements be diminished if they were not attested by the auditor?	44	56·4	34	43·6	30	56·6	23	43·4	1·434	0·495	0·345

TABLE 4

	Europe						United Kingdom								
	Disagree to strongly disagree		Undecided		Agree to strongly agree		Disagree to strongly disagree		Undecided		Agree to strongly agree		Mean	Standard deviation	Coefficient of variance
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Question 17															
(*a*) The measurement of earning power is the single most important need of users of accounting information	14	18·0	14	17·9	50	64·1	4	7·6	7	13·2	42	79·2	4·056	1·071	0·264
(*b*) Historic costs should be retained for external reporting purposes	35	44·9	13	16·7	30	38·4	14	26·5	14	26·5	25	47·1	3·283	1·105	0·336
(*d*) If there are alternative attestable accounting methods available, management should have the freedom to adopt that method which in their opinion reveals the results and status of the entity	30	38·5	13	16·7	35	34·8	25	37·2	8	15·1	20	37·7	2·867	1·318	0·459
(*e*) The order form and terminology of financial statements should be standardised for all organisations within an industry	16	20·5	3	3·8	59	75·7	11	20·7	6	11·3	36	68·0	3·792	1·336	0·352
Question 32															
(*a*) Two types of financial report should be prepared the first being a detailed report for professional users and the other a briefer more readable report for the average shareholder	26	33·3	6	7·7	46	59·0	12	22·6	14	26·4	27	51·0	3·377	1·201	0·355
(*b*) A source and application of funds statement should be included in all published reports	6	7·7	15	19·3	57	73·0	3	5·7	5	9·4	45	75·9	4·283	0·855	0·199

Asset Classification and Asset Valuation

R. G. Walker

Part of the conventional wisdom of accounting is the notion that asset *valuation* should be approached from an initial consideration of asset *classification.* If a particular item is deemed to be a fixed rather than a current asset, then custom dictates that the valuation method applied to that item is selected from one rather than another set of professionally acceptable procedures. Thus, an item of machinery regarded as a fixed asset might be valued at cost less depreciation calculated by any of a variety of methods or rates; an item of machinery deemed a current asset might be valued at one or another variant of the lower of cost and market rule. In this fashion, classification affects both balance sheet aggregates and income calculations.

This notion of linking classification and valuation has been adopted in the recommendations of professional accounting associations, and accepted by committees charged with framing statutory prescriptions for corporate financial reporting. Yet the connection between the two processes does not appear to have been included in lists of concepts supposedly underlying contemporary practice. Nor has there been much discussion of the rationale for valuing fixed and current assets in different ways.

The primary object of the following discussion is to outline the development of the idea of connecting classification and valuation operations. A by-product of this examination is an account of the evolution of UK asset classification practices.

The 'lower of cost or market' rule

The 'lower of cost or market rule' is one of the key valuation techniques commonly associated with current assets. Indeed, it seems that the rule attained wide popularity concurrently with the emergence of rules for linking asset classification and valuation.

R. H. Parker has claimed that the rule became 'accepted as traditional' 'sometime' during the nineteenth century.[1] However, it appears that the expression 'lower of cost and market' was not widely used until the 1890s.[2] And, while the sources cited by Parker suggest that a rule fitting this description was 'well established' as early as 1862, the indications are that there was considerable diversity in the practice of inventory valuation until much later in the century.[3]

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[1] R. H. Parker, 'Lower of cost and market in Britain and the United States: an historical survey', *Abacus*, Vol. 2, No. 1, 1965, p. 158.

[2] The following excerpts from earlier works illustrate the descriptions used. 'Stock should be valued at cost price (unless depreciated in value) and . . . no profit should be estimated until realised'. J. Sawyer, *Bookkeeping for the tanning trade* (London: 2nd edition, 1862; facsimile edition from World Microfilms). 'Cost price should be used if market price exceeded, but market price should be used if cost price exceeded'. J. W. Best, (1886), as cited A. C. Littleton, *Accounting evolution to 1900* (New York: Russell and Russell, 2nd ed., 1966), pp. 309–10. '[An auditor should] see that stocks-in-trade have been taken at *net cost price* and see that all proper deductions for discount, abatements, etc., have been made' (anon) – model answer to Institute examination of June 1885, *The accountants' manual*, Vol. 1 (London: Gee & Co., n.d.), p. B47.

[3] E.g., in 1843 B. F. Foster described recording procedures in which the consideration received on the sale of assets was to be credited to asset accounts so that 'when only a part of the property is disposed of, this difference [between the two sides of the account] is devoid of meaning – it shows neither the value of what is on hand nor the gain or loss'. *Double entry elucidated* (London: Souter and Law, 1843) Part II, p. 11. An 1889 edition described a similar method, to be applied to all 'property' accounts; the 'gain or loss' would not be calculable until 'returns [were] complete'. (London: George Bell & Sons, 14th ed., 1889), p. 9. In 1850, Alexander Pulling described 'commercial usage' as being to record inventories at current market prices' – without reference to historical cost. *A practical compendium of the law and usage of mercantile accounts* (London: Henry Butterworth, 1850), pp. 89–90. Sawyer (1862) having described the rule as a 'recognised principle' then supported the practice of including certain inventories above cost by allowing for a profit upon goods in process of manufacture. Op. cit., p. 197.

Even then, while there was some agreement about the desirability of using 'lower of cost or market', the rule itself was subject to markedly different interpretations. In particular, there appears to have been considerable confusion about whether 'market' meant *present* or *expected* prices, and whether it was intended to relate to prices obtained at auction or in the 'ordinary course of business'.[4]

Significantly, Parker's examination of the application of this rule was confined to the treatment of inventories, not to 'current' assets generally. And, in fact, contemporary accounts of the rule as being a 'sound principle' or as being 'well established in accounting practice' all bear upon the valuation of inventories – *goods*-inventories.[5]

Dicksee's rules for asset valuation

L. R. Dicksee's *Auditing – a practical manual for auditors* first appeared in 1892, and soon became a standard text and reference work. *Auditing* contained a description of an approach to valuation in which different computational techniques were to be applied to different categories of assets. Dicksee introduced this approach by considering whether company financial reports should follow the Double Account form of reporting then required of many governmental undertakings. Under the Double Account system, these undertakings presented two reports: a 'general balance sheet' and a 'capital expenditure account'.

> '. . . the *form* of the Double-Account system arose from the statutory requirement that all capital raised should be used for the carrying out of the works for the execution of which the company was created; . . . the principle that, so long as the works were maintained in a state of efficiency their actual value need not be periodically reconsidered, arose from the circumstances that it was contemplated that the work would be permanently carried on' (p. 119).

Dicksee noted that auditors were not compelled to follow the procedures prescribed for governmental organisations, but suggested that one was compelled by 'a sense of logic' to admit an analogy between the accounts of parliamentary companies and those of other undertakings' (p. 119). Pursuing the analogy, Dicksee noted that the perpetual succession of 'registered' companies enabled one to consider them 'theoretically permanent'. However, the fact that these companies were not bound to retain possession of any of their assets, and the impracticability of stating what were and what were not their 'capital assets', led him to conclude that the 'double account principle of stating values' (i.e., recording capital assets indefinitely at cost) was inappropriate. Rather, assets should be depicted at their 'value as a going concern'.

How should one calculate 'value as a going concern'? Dicksee stated that assets could be divided into two classes: permanent and floating. Permanent assets were said to be 'those *with* which [a firm] carries on business'; floating assets were those *in* which [a firm] carries on business' (p. 121). There were different ways of calculating 'value' for these two classes.

Dicksee's discussion of the valuation of floating assets was illustrated by reference to goods-inventories only. Perhaps this explains why Dicksee claimed that 'the essential feature of these assets [is] that the whole aim of the undertaking is to convert them into cash at the earliest possible opportunity' (p. 121); one can readily conceive of firms dealing *in* goods without endeavouring to resell them as soon as possible, but rather holding them in expectation of a rise in price. In setting out the basis for valuing floating assets, Dicksee asserted that 'the element of immediate realisation' was an 'essential factor'.

> '. . . while a manufacturing profit is earned only when the manufacture is completed, a trading profit is only made when the sale is completed. Neither profit must be anticipated' (p. 121).

Turning to the valuation of permanent assets, Dicksee observed that 'value to the going concern' was affected by both physical 'wasting' (which reduced 'value') and 'fluctuation' (changes in price which might either add to or reduce 'value'). Wasting was clearly an expense and was to be handled by recording 'depreciation'. Fluctuation was 'something altogether apart from profit and loss'.

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[4] Sawyer (1862) allowed for the use of expected rather than current market prices: 'Let the valuation be a *bona fide* one, providing, by deductions from current rates, for the contingency of future depreciation in prices' *idem*. Model answers to 1885 Institute examinations (cited note 2) were sufficiently vague to suggest the use of either current or anticipated market prices; but an 1887 question referred to current market prices only. *The accountants' manual*, Vol. 1, loc. cit., p. F18. Thornton (1895) claimed that in stocktaking one should 'never take Goods at over cost price, even if their market value has risen'. Rather, one should 'value them usually at less, and make ample allowances for depreciation from any and every cause'. But it was a 'great error' to 'take stock at auction prices'. J. Thornton, *A manual of bookkeeping* (London: Macmillan & Co. Ltd., 1895), p. 312.

[5] This position is exemplified by model answers to the Institute's 1887 examinations. Stock in trade was to be valued at the lower of cost and market; but securities 'acquired by a company in the ordinary course of business' were to be recorded at current market prices. *The accountants' manual*, Vol. I, loc. cit., p. E59.

> 'Fluctuation is merely the accidental variation (owing to external causes) in the value of certain property owned, but not traded in: to carry the amount of such variation to Profit and Loss Account would be to disturb and obscure the results of actual trading, and so render statistical comparison difficult if not impossible. On no account, therefore, should the results of fluctuations affect the Profit and Loss Account' (p. 121).

Despite this concern that accounting reports should reveal operating performance without regard to losses or gains arising from changes in the price of permanent assets, Dicksee was careful not to rule out the possibility of recognising the effect of price changes in balance sheets. He argued that the auditor's duty was 'clearly . . . to sufficiently acquaint the shareholders with the facts of the case to enable them to intelligently exercise their own discretion as to whether they will pass the accounts in the form in which they are presented to them'.

> 'Thus where the assets are stated below their certainly-known value (forming a secret reserve), or above their certainly-known value (forming a secret deficit), at least the bare facts should be mentioned in the Auditor's certificate' (p. 136).

It appears that Dicksee was the first to propose this treatment. The suggestion that assets should be classified may have been prompted by an attempt to translate economists' notions of 'fixed' and 'floating' capital into an accounting context; Adam Smith's *An enquiry into the nature and causes of the wealth of nations* (1775) and Ricardo's *The principles of political economy and taxation* (1817) had both employed similarly titled concepts but in far wider contexts. The suggestion that asset valuation should then be related to asset classification appears to have been an attempt to extend the application of double-account procedures to registered companies. But whatever their source, both of these suggestions were to lay the groundwork for long-enduring accounting practices.

Dicksee's classification-valuation proposals were not instantly popular with practitioners. But within a few years accountants were looking very closely at these ideas – in response to a series of judicial decisions dealing with the availability of profits for distribution as dividends.

Profit distributions and the courts

From the 1860s British courts had been concerned with litigation in connection with the payment of dividends. In several early cases, company directors had been held liable to repay wrongly-disbursed amounts.[6] Two later decisions were of particular significance to accountants. In 1887, it was held that a company auditor was liable to repay the amount of wrongly-disbursed dividends: in this instance, because a dividend had been paid contrary to the conditions prescribed in the company's articles.[7] In 1895, it was held that auditors were company officers and as such were liable to refund the amount of dividends, plus interest, if they were found guilty of misfeasance.[8]

Not surprisingly, reports of cases dealing with the distribution of dividends and the associated liabilities of auditors were of pressing interest to practitioners. Extracts and summaries of these judgments were included in successive editions of Dicksee's *Auditing*. The 1896 edition of Pixley's *Auditors: their duties and responsibilities* added a chapter on 'profits available for dividends'.[9] Similar material was included in A. E. Cutforth's *Audits* (1908)[10] and Spicer and Pegler's *Practical Auditing* (1911).[11]

At the time there was no statutory prohibition on joint stock companies paying dividends 'out of capital'[12] or otherwise than 'out of profits'. The 1862 Companies Act had included a clause stating that 'no dividend shall be payable except out of the profits arising from the business of the company' but this only appeared in a set of model articles, which companies were not obliged to follow.[13] The notion of a 'divisible profit' was derived from 'the golden rule that capital might not be reduced which . . . [judges] had deduced from . . . provisions of the Companies Acts'[14] – provisions to the effect that the paid-up capital of a company could only be used for the furtherance of the company's declared objects, and that capital might only be reduced under the supervision of the courts. The effect of several decisions in this area has been described as 'forbidding any dividend payment which would have left the value of the remaining assets below the company's paid-up capital'.[15] This could be taken as indicating 'that the company's assets, if sold for cash, should realise an amount at least equal to its paid capital',[16] though it appears that courts were prepared to accept that accounting reports represented the 'value' of a company's assets.[17]

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[6] For a general description of these developments see A. C. Littleton, op. cit., pp. 214–21.

[7] *The Leeds Estate Building and Investment Society, Lim v. Shepherd* 1887, 36 Ch. 787.

[8] *London and General Bank* (No. 1), 1895, 2 Ch. 166.

[9] A. C. Littleton reproduced the table of contents from the 1st edition of Pixley's book (1881) (as it appeared in *The accountant*, 19 February 1881) and noted the addition of a chapter on these cases in the 7th, 1896 edition. Loc. cit., p. 318.

[10] London: Gee & Co.

[11] London: Foulks Lynch & Co.

[12] Gower noted that such a prohibition had appeared in the Companies Clauses Act in 1845, which related to statutory companies. L. C. B. Gower, op. cit., p. 115.

[13] Table A, article 73.

[14] Gower, op. cit., p. 115. See also B. S. Yamey, 'The case law relating to company dividends' in W. T. Baxter & S. Davidson (eds.), *Studies in accounting theory* (London: Sweet and Maxwell Ltd., 2nd. 1962), pp. 428–30.

The 1889 case of *Lee v. Neuchatel Asphalte Company Ltd.*[18] is said to have marked a change of attitude.[19] The plaintiff objected to the company calculating profit without allowing for an expense to represent the depletion of a mine. However the court refused to intervene, and stressed that the calculation of profits was 'very judiciously left to the commercial world'.

> 'It is not a subject for an Act of Parliament to say how accounts are to be kept; what is to be put into a capital account, what into an income account, is left to men of business.'[20]

In effect the court abandoned the previously-held notion that a company was only entitled to pay a dividend if its 'capital' was not intact. Later cases reaffirmed this decision and extended its application. In *Bolton v. Natal Land and Colonisation Co. Ltd.* it was held that a company could calculate distributable income without allowing for reductions in asset values.[21] In the *Kingston Cotton Mill* case it was held that a dividend was not wrongfully paid by a company which had not charged depreciation expenses to profit and loss; if depreciation had been recorded the company in question would have reported a loss rather than a profit.[22] But the 'new doctrine' was 'established more firmly than ever'[23] in the 1894 case of *Verner v. General and Commercial Investments Trust.*[24] Securities held by the trust had 'depreciated to the extent of about £240,000, of which it was estimated that about £75,000 represented an amount which there was no prospect of recovering within any reasonable period of time'.[25] During the financial year, the company's income from investments had exceeded its current expenses by more than £23,000. 'The question for the Court to decide was whether such excess could be utilised for the purposes of Dividend without taking into account the loss of Capital to the amount of £75,000'.[26] The court decided that the excess could be used to pay a dividend and that there was no need to make good the loss of capital.

The judgment of the appeal court in the Verner case contained the following 'classic and always-quoted pronouncement of the doctrine' which had first been propounded some years earlier in the *Lee v. Neuchatel Asphalte* case:

> 'Fixed capital may be sunk and lost, and yet . . . the excess of current receipts over current payments may be divided, but . . . floating or circulating capital must be kept up . . .'.[27]

Influence of dividend cases on accounting practice

The immediate effect of the dividend suits, and the Verner case in particular, was that accountants looked more closely at asset classification. It was acknowledged at the time that the Verner case had prompted practitioner-interest in asset classification.[28] 1894 was the first year in which a question concerning the distinction between 'fixed' and 'floating' assets appeared in an Institute examination paper.[29] However by 1899 asset classification had 'been discussed over and over by various meetings of Accountants' and Students' Societies'.[30]

The language of the courts appears to have influenced accounting terminology. Initially, Dicksee labelled his asset categories 'permanent' and 'floating'. But he and other writers soon adopted the terms 'fixed' and 'circulating' – the terms used in a legal context to refer to categories of 'capital'.

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[15] Yamey, op. cit., p. 430.

[16] *Idem.* See also H. B. Buckley and A. C. Clauson, *The law and practice under the companies acts . . .* (London: Stevens and Haynes, 7th ed., 1897), p. 557.

[17] Yamey, op. cit., p. 430.

[18] 1889, 41 Ch. 1.

[19] Yamey, op. cit., pp. 431–3; Gower, op. cit., pp. 116–7.

[20] Lindley, L. J., as cited Yamey, ibid, p. 432.

[21] 1892, 2 Ch. 124. See commentary in Buckley, op. cit., p. 558.

[22] (No. 2) 1896, 1 Ch. 331, 2 Ch. 279, C.A.

[23] Yamey, op. cit., p. 433.

[24] 1894, 2 Ch. 239.

[25] Spicer & Pegler, op. cit., pp. 347–8.

[26] Ibid, p. 348.

[27] Yamey, op. cit., p. 434.

[28] R. Warner, ' "Fixed" and "Circulating" Assets', Correspondence. *The accountant,* 4 March 1899, p. 251.

[29] *The accountants' manual,* loc. cit., Vol. IV (1894), pp. 362–3.

[30] Warner, *idem.*

The judgments in the dividend distribution cases focused attention on the need to have regard to gains or losses enjoyed or incurred through holding certain resources. While the courts had been concerned with categories of *capital*, accountants were quick to apply this distinction to *assets*. Spicer and Pegler's *Practical auditing* (1911) stated the position as follows:

> 'The terms 'Fixed' and 'Floating' or 'Circulating' Capital . . . are equivalent to that portion of the Capital represented by 'Fixed' or 'Floating' Assets'.[31]

In effect, the dictum that 'fixed capital may be sunk and lost but circulating capital must be kept up' was taken as establishing ground rules for asset valuation. Practitioners adopted classification schemes similar to those which had been proposed by Dicksee. They did so with an eye to satisfying legal rules governing dividend distributions. In the light of subsequent developments it is important to note that, initially, asset classification was simply a notional categorisation for the purpose of selecting valuation methods; it was in no way associated with balance sheet presentation with the object of representing a firm's solvency or liquidity.

But while accountants came to accept that different groups of assets should be valued in different ways, they did not agree about what methods should be used – particularly in respect of fixed assets.

There was a near consensus about the treatment of floating assets. Spicer and Pegler summarised the legal position as requiring that 'depreciation on Floating Assets must be made good before the payment of dividends'[32] – in other words, as supporting use of the lower of cost and market rule. This interpretation was actually contrary to that arrived at by legal experts. Buckley, author of the standard text on company law, interpreted the prescription that 'floating or circulating capital must be kept up' as requiring that both *depreciation and appreciation* of floating assets be 'the subject of entry in the profit and loss account'.[33] But it does not appear that accountants seriously entertained the possibility that they might be obliged to record appreciation. However, acceptance of the view that the lower of cost and market rule should be applied to *all* floating assets was a substantial departure from the prior association of the rule with goods-inventories only.

The treatment of fixed assets remained an unsettled question, though the dividend cases influenced the debate. Much of the diversity of opinion can be attributed to confusion over the legal significance of the cases. Further differences arose from the view taken of an accountant's responsibilities: some writers merely sought to indicate which procedures would enable practitioners to avoid liability for improper dividend distributions, while others aimed at devising methods which would provide useful information.

One interpretation of the court decisions was that fixed assets could be left at cost, without reference to market prices. As one practitioner put it, circulating assets were 'liable to revision for the purposes of the annual Balance Sheet', while fixed assets were not.[34] It appears that this interpretation was widely held; undoubtedly it was a misstatement of the legal position. The law at the time said nothing about whether depreciation should be calculated or whether fixed assets need not be periodically revalued. The courts had not been called upon to answer these questions. The case law only established that the courts would not interfere with the payment of dividends from profits calculated one way or another so long as certain conditions prevailed – chiefly that the company's articles permitted the dividend in those circumstances and that creditors would not suffer. If the judgments contained any guide about the valuation of fixed assets, they certainly did not put the seal of approval on cost-based valuation if cost figures were greater than current market prices. In the Verner case, Lindley, L. J. made the *obiter* statement that 'capital lost must not appear intact'; in the London and General Bank case, an auditor's comment that investment values were 'subject to realisation' was held to be an inadequate warning of balance sheet overstatement.[35]

Dicksee, on the other hand, cautioned against attaching undue importance to the legal decisions when considering asset valuation:

> 'Under certain circumstances it might not be necessary for a company, before declaring a dividend . . . to provide in that year's accounts for the whole of the loss caused by the shrinkage in intrinsic value of the whole or some portion of its assets'.

Indeed, he rejected suggestions that changes in the market prices of permanent assets could be ignored by accountants, claiming that where assets were stated above or below their 'certainly known value' then 'at least the bare facts should be mentioned in the

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[31] Op. cit., p. 358.

[32] Op. cit., p. 360.

[33] Op. cit., p. 555.

[34] Warner, *idem*.

[35] *London and General Bank* (No. 2), 1895, 2 Ch. 673.

Auditor's certificate'.[36]

An intermediate position emerged soon after the *Verner*, *London and General Bank*, and *Kingston Cotton Mill* cases. The view taken was that fixed assets could be left at cost except when the discrepancy between cost and market selling price became extreme. An anonymous contributor to *The accountant* summarised these views as follows:

> 'There must always be a certain amount of margin between a Balance Sheet which improperly overstates and a Balance Sheet which improperly understates the position of affairs; and, within the limits of that margin, it is clearly the privilege, as well as the duty, of directors to exercise a reasonable and honest discretion. It is only when these limits are exceeded that the auditor is called upon to intervene'.[37]

An editorial in *The accountant* expressed emphatic agreement with this statement of the position. Neither editor not contributor endeavoured to specify or illustrate the conditions under which recorded measures might constitute an 'improper' misstatement. But the editorial argued that an auditor would only be justified in seeking revision of asset values or in issuing a qualified report if there was evidence of improper motives:

> 'Our own opinion is that the auditor would require to be very thoroughly satisfied that these limits were exceeded and exceeded *mala fide*, before it would be at all desirable for him to interfere'.[38]

Probably the most enduring interpretation of the accountant's responsibilities in the light of changes in the law was that suggested by Spicer and Pegler. They concluded that while the availability of dividends for distribution was 'a question of fact to be determined by the Court', auditors would be wise to play safe. Auditors should report to shareholders when losses had not been written off.

> 'As long as the Auditor places [shareholders] in possession of the facts, he will have absolved himself of any responsibility . . .' (p. 361).

Unlike Dicksee, they did not suggest that the understatement of assets warranted an audit qualification.

But regardless of differences in interpretation of case law and regardless of disagreement about appropriate accounting practice for particular assets, the dividend distribution cases were certainly followed by agreement that different valuation methods should be applied to different categories of assets.

Confusion over asset classification

The 1890s saw widespread acceptance among accounting writers of the idea of linking asset classification with asset measurement. The turn of the century saw a developing confusion about classification criteria.

The scheme of classification suggested in the 1892 edition of Dicksee's *Auditing* was based on patterns of asset utilisation. A firm's permanent assets were 'those *with* which it carries on business'; its floating assets were those *in* which it carries on business' (p. 121). This distinction evidently found favour at the time. Model answers to the June 1894 Institute examinations distinguished fixed and floating assets in similar terms, and referred students to Dicksee's *Auditing* for 'further information on the subject'.[39] G. Lisle's text *Accounting in theory and practice* (1899) also distinguished asset categories on the basis of 'use in the business'.[40]

By the time of the sixth edition of *Auditing* (1904), Dicksee abandoned the term 'permanent' in favour of 'fixed', and switched the criteria for asset classification from *ex post* to *ex ante* judgments about asset use.

> 'The proper distinction between fixed and floating assets must, it is thought, always rest with the *intention* of the parties owning such assets, and the manner in which they propose to utilise them; . . . it may be permissible for an undertaking to change its views with regard to particular assets from time to time, provided such change of views can be made *bona fide* . . .' (p. 291).

There had been a few earlier, isolated references to 'intention' as the basis of asset classification.[41] However, in 1908 editorial writers of *The accountant* adopted the idea of classifying in terms of intention. Fixed assets were said to be those which 'managers' intended to retain in the existing form for the purposes of the business carried on – they were not to 'be realised as soon as may be'. *The accountant* was fully in agreement with Dicksee in observing that changes in plans would affect asset classification – and correspondingly, asset valuation:

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[36] 7th ed., p. 288. cf. Storey's summary of Dicksee's position: 'His principles of valuation were based on the concept that assets should be valued according to (1) the assumption that the business intended to continue operations . . . and (2) the dividend requirements of the law. In the case of fixed assets, only the wasting that directly contributed to profit was to be charged to revenue, while fluctuations in value due to external factors must not be allowed to affect the Profit and Loss Account', R. K. Storey, 'Revenue realisation, going concern and measurement of income', *The accounting review*, April, 1959, p. 234.

[37] 'F.C.A.', 'Some contested points in auditing practice', *The accountant*, 1 April 1899, p. 365.

[38] 'Hidden liabilities and hidden reserves', ibid, 15 April 1899, p. 413.

[39] *The accountants' manual*, Vol. IV (London: Gee & Co., 1894), pp. 362–3.

[40] Edinburgh: William Green & Sons, p. 67.

[41] E.g., 'Notes on balance sheets', *The incorporated accountants' journal*, February 1898, p. 66; A. L. Hellyer, 'Depreciating assets, sinking funds and kindred subjects', *The accountant*, 29 July 1899, p. 811; W. Strachan, 'Some remarks on balance sheets and profit and loss accounts', *The incorporated accountants' journal*, May 1903, p. 173. Model answers to a 1901 Institute examination described asset classification in terms of 'intention', but solutions to later papers reverted to references to asset use. See *The accountants' manual*, Vol. VIII (1902), p. 220; Vol. X (1906), p. 517.

> 'With certain classes of undertakings, and with others under certain circumstances, even the most unlikely assets may be (or become) floating assets, in which event their current market prices are material factors for Balance Sheet purposes'.[42]

Thereafter, the literature contained frequent references to 'intention', and, particularly in the case of floating assets, 'intention to sell'. The growing use of this criterion may have corresponded with a shift towards viewing asset classification as a means of indicating a firm's liquidity. American accountants had for some time been consciously using balance sheet arrangements to reflect this aspect of a firm's position.[43] But – with isolated exceptions[44] – discussions in the British literature still linked classification with valuation rather than balance sheet presentation. For example, L. C. Cropper (1911) distinguished fixed and circulating capital in terms of intended use, and linked these distinctions with valuation practices – but then claimed that the most appropriate balance sheet presentation was to rank assets in order of their realisability.[45] While Cropper was keen for balance sheets to indicate liquidity, he did not think of asset classification as the means of achieving this objective.

While several writers latched on to the idea of classification by 'intention' there was still scope for experimentation. For example, M. Webster Jenkinson defined the categories as follows:

> '[Fixed assets are]:
> (a) Fixed or Permanent, i.e. acquired for the purpose of being retained in the business ... or
> (b) Wasting, i.e. gradually consumed in the process of earning profits ...'.
> '[Floating assets are]:
> (a) Those acquired for the purpose of re-sale at a profit ... or
> (b) Those representing an incomplete stage in the conversion to cash ... or
> (c) Cash'.[46]

Whereas Dicksee's 1892 and 1904 classification schemes respectively referred to (a) the past pattern of asset use and (b) current plans for asset-use, Jenkinson referred to (c) past plans for asset-use – held at the time of acquisition.

The adoption of one rather than another criterion would affect the classification of certain assets. For example, an item of plant which was bought for use in some manufacturing process but which is now slated for sale, would be a fixed asset in terms of (a) and (c) but a floating asset under (b). Securities bought by a firm seeking to invest idle funds could be neither fixed not floating assets in terms of (a); if managers currently planned to sell the securities they would be floating assets under (b) but fixed assets under (c). And goods acquired for the purpose of resale but subsequently retained for some other purpose would be fixed assets in terms of (a) and (b) but floating assets in terms of (c).

A different classification test was proposed by Spicer and Pegler. In effect, they combined the criteria described in different editions of Dicksee's *Auditing* by alluding to both (a) the past pattern of asset use and (b) current plans for asset use. Then they complicated matters by referring to both plans to sell assets and plans to earn income from holding assets:

> 'Fixed assets are those of a permanent nature, by means of which the business is carried on and which are held for the purpose of earning income and not for the purpose of sale.
> 'Floating assets are those in which the business deals, and which are acquired for the purpose of sale ...' (p. 133).

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[42] 'Balance sheet values', 11 January 1908, p. 42.

[43] Foulke notes that several American railroad companies were early users of 'current' categories in balance sheets; the practice may have been introduced by the Pennsylvania Railroad Company in 1901. Foulke's enquiries also revealed that at least six public accounting firms had espoused balance sheet classification prior to 1914 – the earliest in 1898. R. A. Foulke, *Practical financial statement analysis* (New York: McGraw-Hill Book Company Inc., 1945), p. 175ff. See also *The accountant*, 22 April 1905 for a reproduction of an 'American balance sheet' setting out 'current liabilities' and 'quick assets'.

[44] E.g., W. D. Elgar's lecture to the Incorporated Accountants' Students Society, reproduced in *The incorporated accountants' journal*, July 1901, p. 194. A leading article in the same issue said that while balance sheets prepared in accord with Elgar's novel recommendations 'could hardly fail to be of assistance to a board of directors' it was 'difficult ... to say how far the system could be utilised for the purpose of publication' (p. 185). See also W. Strachan, 'Some remarks on balance sheets and profit and loss accounts', ibid., May 1903, p. 172; G. S. Pitt, 'Forms of published accounts', *idem*, October 1908, p. 10.

[45] *Book-keeping and accounts* (London: Macdonald and Evans, 1911), pp. 121, 128–9.

[46] *Book-keeping and accounting* (London: Edward Arnold, 2nd ed., 1912), p. 11.

Without detailing all the consequences of adopting this scheme, it may be noted that it would not encompass such assets as (i) those acquired for the purpose of resale but which are later held for some other purpose, (ii) those not used to 'carry on' designated business activities (e.g. the shareholdings of a firm which was predominantly engaged in retailing) and (iii) those acquired with the dual object of producing trading revenues and holdings gains.

It appears that writers at the time did not look closely at the consequences of adopting this or that classification criterion. There were some extraordinarily complicated explanations of the fixed/floating distinction. F. R. M. de Paula, for example, alluded to both past and present intentions, and then concluded by alluding to patterns of asset use:

> 'Fixed assets are those assets of a permanent nature which are acquired by an undertaking with a view to earning profits for a period of years by the use of the same, and such assets are not held with a view to resale . . .
>
> 'On the other hand, floating assets are those assets which are produced or acquired by an undertaking in the course of, or for the purpose of, its trading, and are held with a view to conversion into cash as soon as possible'.
>
> 'Floating assets . . . are the assets *in which* we trade, as opposed to fixed assets, which are those *with which* we trade'.[47]

Correspondingly, many of the classification schemes did not encompass all of a firm's assets. F. R. M. de Paula's scheme, for example, did not cover (i) assets which were acquired with one object but which later were the subject of different plans, and (ii) assets (such as securities) which were held for objectives disassociated from a firm's day to day activities. Presumably accountants were not overly concerned with the niceties of asset classification, and simply adopted a liberal interpretation of one definition or other. Certainly Webster Jenkinson was happy to describe investments as 'practically fixed assets'.[48]

Statutory endorsement of asset classification

Asset classification finally became entrenched in accounting practice in 1907 with the passage of legislation obliging company accountants to describe how 'fixed' assets had been valued.

Until 1907, UK companies legislation contained no general requirements for companies to publish or otherwise disseminate financial information. And then, the 1907 Act did not explicitly require that information be transmitted to shareholders – though it was later claimed that the Act 'assumed' an audited balance sheet would be tabled at annual general meetings.[49] The major 1907 innovation was the requirement that firms lodge documents with the Registrar, including

> 'a statement, made up to such date as may be specified in the statement, in the form of a balance-sheet, audited by the company's auditors, and containing a summary of its share capital, its liabilities, and its assets, giving such particulars as will disclose the general nature of such liabilities and assets, and *how the values of the fixed assets have been arrived at* . . .'.[50]

These provisions substantially followed the recommendations contained in the 1906 report of the 'Loreburn' Company Law Amendment Committee.[51] Significantly, an earlier Company Law Amendment Committee under the chairmanship of Lord Davey had unsuccessfully recommended that companies should be required to publish annual balance sheets which stated how the valuation of *all* assets had been calculated.[52] Evidently in the space of eleven years the practice of linking asset classification and valuation had become so accepted that the Loreburn Committee could assume that only fixed assets might be overstated – circulating assets would be valued at the lower of cost and market.

The 1907 Act's references to classification were concerned with valuation rather than with the presentation of indicators of a firm's liquidity through balance sheet arrangements. But this did not reflect a lack of concern with the interests of creditors. The Loreburn Committee's advocacy of the filing provisions was founded on the belief that this step would give creditors the opportunity to investigate the financial standing of firms; accordingly, the committee argued (unsuccessfully) that the filing provisions should be applicable to both public and private companies.[53] Again, the rule that balance sheets were to include some statement of the 'general nature' of a firm's assets and liabilities was aimed at ensuring that creditors could make their own evaluation of a firm's financial position. But neither the committee nor the legislature were prepared to require companies to provide details of asset holdings, and so the question of how various items should be arranged in the balance sheet did not arise.

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[47] F. R. M. de Paula, 'Some further notes on auditing', *The accountant*, 22 March 1913, p. 445.

[48] Op. cit., p. 84.

[49] Companies Act, 1907, s. 19; see discussion of this section in 'Company law reform in relation to the accounts of public companies', *The accountant*, 14 February 1925, p. 257.

[50] S. 21. Emphasis added.

[51] Report of the Company Law Amendment Committee, British Parliamentary Papers, 1906, Vol. 97, No. 3052, para. 33; this section of the report is reproduced in *The accountant*, 14 July 1906, pp. 52–3, and discussed 25 August 1906, pp. 204–5.

[52] Report of the Company Law Committee, British Parliamentary Papers, 1895, Vol. 88, No. 7779.

However, in succeeding years many firms published balance sheets which were so highly condensed that they failed utterly to provide any sensible indication of the composition of their asset holdings. By the time that the next general investigation of company law was instituted two decades later, there was a widespread demand for fuller disclosure. The Greene Committee accepted the validity of these demands and accordingly recommended that shareholders should be provided with balance sheets which showed preliminary expenses, goodwill, and shares in or loans to subsidiary companies as separate items.[54] This recommendation was adopted in the Companies Act of 1928, in conjunction with prior requirements for disclosure of the general nature of assets and liabilities, and the basis of fixed asset valuation.[55] But when the 1928 provisions were incorporated in a 1929 consolidating statute, they were redrafted to require that balance sheets 'distinguish between the amounts respectively of the fixed assets and of the floating assets'.[56]

This sequence of events might suggest that the legislature suddenly decided that balance sheets should be classified so as to represent a firm's liquidity. Indeed, during the 1920s the UK literature had contained some hard advocacy of this practice.[57] But it appears that the 1929 rules were only aimed at enhancing a reader's chances of assessing the reliability of balance sheet figures; the redrafted clause was intended to ensure that financial reports conveyed some sense of the relative significance of a firm's assets. Moreover, the clause in question did not formally require the arrangement of assets in categories. Firms could comply with the Act by simply indicating whether particular assets were fixed or floating.[58]

However there is little doubt that the 1929 Act fostered balance sheet grouping of fixed and floating assets, although it was not until 1948 that UK company law formally required the classification of assets for balance sheet purposes.

The 1948 Companies Act was again drafted following the investigations and recommendations of an investigating committee, this time under the chairmanship of Mr. Justice Cohen. The Cohen Committee's discussion of asset classification was centred on the link between classification and valuation practices, and the Committee accepted the Institute's claims, that 'a balance sheet is . . . an historical document' which 'does not as a general rule purport to show the net worth of an undertaking at any particular date'.[59] The Committee even went so far as to recommend that fixed assets should be shown at cost, less the aggregate amount provided or written off since the date of their acquisition – a recommendation which could have effectively banned the writing-up of fixed assets. But the Committee saw the need to accommodate situations where past records did not enable the calculation of cost, or where it was not practicable to maintain detailed records, or where assets had been obtained on the acquisition of an existing business for a lump sum.[60] Accordingly when the 'fixed assets at cost' recommendation was incorporated in the 1948 Act it was overridden by provisions allowing the use of 'valuation' figures (or 'valuations' less amounts written off).[61]

The Cohen Committee broke new ground in attempting to prescribe the basis of distinguishing fixed and current assets:

> 'The section shall define "fixed assets" as assets not held for sale or for conversion into cash and "current assets" as cash and assets held for conversion into cash'.[62]

The emphasis on convertibility into cash was consistent with efforts to represent liquidity by balance sheet arrangements. Further, the Committee made unambiguous proposals that fixed and current assets be grouped and sub-totalled.

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[53] Op. cit., paras 32–3, 45–6. (The latter section of the report is reproduced in *The accountant*, 21 July 1906, pp. 83–4.)

[54] Report of the Company Law Amendment Committee, British Parliamentary Papers, 1926, Vol. 9, No. 2657.

[55] Companies Act, 1928, s. 40.

[56] Companies Act, 1929, s. 124.

[57] See, e.g., 'Company law reform in accounts', (contributed by an anonymous 'well-known financial journalist'), *The accountant*, 14 February 1925, p. 262.

[58] See counsel's opinions obtained by both the Institute and the Society; *The accountant*, 31 August 1929, p. 280 and *The incorporated accountants' journal*, December 1929, supplement, p. 5.

[59] Report of the Committee on Company Law Amendment, (London: H.M.S.O., 1945), pp. 54–5, para 98.

[60] *Idem*, pp. 55–6, para. 100.

[61] Companies Act, 1948, 8th Sch., clause 5.

[62] Op. cit., p. 58.

In the event, the 1948 Act did not adopt the definitions – perhaps because in 1944 the Institute had published conflicting definitions, and it may have seemed wiser to leave technical accounting problems to the profession. But the proposal for the segregation of asset categories was retained. In retrospect, the introduction of asset classification as a means of balance sheet presentation had been accomplished after only slight consideration by the Cohen Committee and after virtually no discussion within the UK accounting profession.

Institute recommendations

The foregoing account of statutory developments reflects a fundamental confusion about the object of asset classification. The recommendations of the Institute of Chartered Accountants have reinforced this confusion by asserting that the processes of classification and valuation are linked, and then associating classification with the representation of liquidity.

Recommendation 8 (1944) was the profession's first official statement on these issues. The recommendation described current assets as those 'held for realisation in the ordinary course of business'. No attempt was made to define fixed assets – the recommendation simply listed items which would fall within that category, and implied that assets which weren't current were to be classed as fixed. The reference to current assets as being 'held for realisation' was in effect a revival of the classification criterion popular around 1900 – managerial intention. Since assets which managers 'intend to realise' may not be all 'readily realisable', the adoption of the 'intention' criterion was not consistent with efforts to represent liquidity. But Recommendation 8 contained a significant proviso: investments were to be treated as current assets if they were 'held as part of the liquid resources of the company' even if they weren't held for prompt realisation. This proviso was evidently aimed at placing marketable investments – which could be a significant proportion of a firm's readily realisable assets – in the 'current' category.

At the same time Recommendation 8 firmly associated particular calculation procedures with asset classes. This link was reaffirmed in the later Recommendation 10 (1945), which asserted that stock in trade was a current asset and '*therefore* [is] usually shown at the lower of cost or market value'.

The publication of Recommendation 18 (1958) reported a reconsideration of the basis of asset classification, though without eliminating any of the uncertainties surrounding the object of this process.

Whereas the Institute's eighth recommendation had only defined 'current asset' and implied that all other assets were 'fixed', the eighteenth recommendation reversed the procedure by describing 'fixed assets' and leaving 'current asset' undefined. The 'fundamental characteristic' of fixed assets was said to be that 'they are held with the object of earning revenue, directly or indirectly, and not for the purpose of sale in the ordinary course of business'. The Institute thus outwardly rejected a liquidity-based scheme, and continued to emphasise the significance of classification to the choice of valuation methods. But matters were complicated by the assertion that the two asset classes were not all-encompassing:

> 'The division of assets into either "fixed" or "current" is not always practicable and could be misleading.'

The example given was that of 'interests in subsidiaries'. Now since loans to subsidiaries could hardly be said to be 'held with the object of earning revenue' they would *prima facie* be regarded as current assets. The explicit exclusion of these assets from the current category seems to have been aimed at limiting 'current assets' to those which were readily realisable.

Both the 1944 and the 1958 recommendations had described classification schemes and then made contradictory recommendations with the effect of bringing 'current assets' closer to 'realisable assets'. The criterion of 'managerial intention' was not selected with the object of representing liquidity. For that matter, the exact object of asset classification had not been discussed in the Institute's pronouncements. It never seems to have occurred to the authors of these pronouncements that a classification scheme based on managers' expectations could not represent anything about the financial state of a firm.

Résumé

The idea of linking asset valuation and classification emerged in UK accounting in the 1890s. In 1892 L. R. Dicksee proposed such an association after discussing whether company accounting could be likened to financial reporting of governmental undertakings under the 'double account' system. Later in the 1890s the profession adopted a rule prescribing that different categories of assets were to be valued differently – in the belief that use of these accounting practices would ensure that company dividends were not improperly paid, and accordingly that practitioners would avoid liability in respect of these distributions.

During the 1920s UK accountants began to associate asset classification with the arrangement of balance sheet items to indicate a firm's liquidity. This change in the application of asset classification was not accompanied by a re-examination of classification criteria. In fact, the criteria described in recent Institute pronouncements were similar to (and derived from) criteria advocated in the early years of this century. But the criteria inherited from earlier years were not intended to represent liquidity, and in fact they are totally inappropriate to meet this objective.

The association of balance sheet classification with liquidity analysis was not accompanied by the discarding of the 1890s rule of applying different valuation methods to different categories of assets. Initially, adoption of the rule may have seemed an intelligent way of coping with a rapidly changing, bewildering and threatening legal environment. After seventy-odd years, it is time to question whether the rule is justified.

The Lease Evaluation Solution

E. C. Bloomfield and Ronald Ma

I Introduction

A variety of methods have been proposed for the evaluation of financial leases.[1] It is the contention of this paper that the typical text book treatment[2] and the approaches advocated by specialist articles on the topic fail to ensure strict comparability of alternatives.[3] Further, it is argued that the cost of equity capital is the appropriate discount rate to be used in comparisons between alternatives involving financing costs.

Following a brief outline of the decision problem facing management in lease evaluation, the assumptions are stated and an analysis is presented to support the proposition that the appropriate method of evaluation requires a net present value comparison of cash flows accruing to shareholders under the lease option and under a borrowing alternative which would impose identical repayment obligations. The proposed procedure is illustrated by a simple example.

II The Decision Problem: Assumptions and Analysis

A firm has decided to acquire an asset for a fixed period of T years and wishes to determine whether a proposed financial lease is the best method of financing the acquisition from the viewpoint of its shareholders, whose interests are deemed to be served best by decisions taken with the objective of maximising the market value of the currently outstanding shares.

The firm is able to borrow funds at interest rate r, which is less than the rate k_w which the firm uses as a hurdle rate for investment proposals, and which is management's best estimate of the firm's weighted average cost of capital, given the firm's capital structure and business risk.

The following assumptions are made:

(i) The market price of a firm's shares is a positive function of the expected cash flows accruing to shareholders and a negative function of the rate at which these cash flows are capitalised in the market, i.e. the cost of equity capital.

(ii) The equity capitalisation rate takes into account both the business risk associated with a firm's cash flows and the capital structure of the firm.

(iii) The subject firm maintains a target average debt-equity ratio. Although the firm obtains funds as required at irregular intervals and from varied sources (equity funds from earnings retention and new share issues, borrowings from debenture issues, bank loans, etc.) so that at any point in time the debt-equity ratio might exceed or fall short of its target value, the equity capitalisation rate is not sensitive to these minor fluctuations in the firm's capital structure.

(iv) The firm's decision to acquire the asset stemmed from a conventional capital budgeting analysis. The asset was considered as an independent investment project whose adoption would not affect the business risk of the firm. Hence, the following criterion was satisfied:

$$\sum_{t=1}^{T} \frac{Y_t}{(1+k_w)^t} > C_0 \qquad (1)$$

where Y_t = net cash flows, after taxes, expected from asset operation in period t;

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[1] Sufficient diversity of methods to illustrate the almost complete lack of consensus on the appropriate approach to lease evaluation can be found in articles by R. F. Vancil, 'Lease or Borrow: New Method of Analysis', *Harvard Business Review*, 39 (September–October, 1961). R. S. Bower, F. C. Herringer and J. P. Williamson, 'Lease Evaluation', *Accounting Review*, XLI (April, 1966). R. W. Johnson and W. G. Lewellen, 'Analysis of the Lease-or-Buy Decision', *Journal of Finance* (September, 1972).

[2] For example J. C. T. Mao, *Quantitative Analysis of Financial Decisions* (Toronto: Macmillan, 1969). J. C. Van Horne, *Financial Management and Policy* (Englewood Cliffs, N. J.: Prentice-Hall, 1971).

[3] An exception is found in the text by C. G. Peirson and R. G. Bird, *Business Finance* (Sydney: McGraw-Hill, 1972); although the theoretical rationale for their approach is not explained.

T = number of periods during which the asset is expected to generate revenue;
C_o = cost of asset at time $t=0$; and
k_w = after-tax weighted average cost of capital.

(v) The firm has been offered a financial lease of the asset and the lease would impose a contractual obligation for a series of payments $L_o, L_1, \ldots, L_{T-1}$, where L_t is the amount due at time t. The firm believes that the addition of these fixed charges under the lease arrangement would be viewed by the market in the same light as equivalent fixed charges arising from new borrowings, and that the current debt-equity ratio is such that the acceptance of the lease (or the issue of new debt involving the same fixed charges) would not affect the firm's equity capitalisation rate.

The analysis

With the maximisation of the market value of its outstanding shares as its objective, the firm has the problem of determining whether the lease option or an alternative financing plan would be more highly valued by shareholders. However, this is a relatively simple exercise given that the equity capitalisation rate is not affected. All that is required is that the incremental cash flows unique to each option be determined and their net present values calculated at the equity capitalisation rate.

In the capital budgeting analysis which led to the decision to acquire the asset, the value of

$\sum_{t=1}^{T} \frac{Y_t}{(1+k_w)^t}$ was derived (expression (1) above). If the lease option is accepted the cash flows relevant to the asset's acquisition and operation (from the shareholders' viewpoint) are:

$$\sum_{t=1}^{T} Y_t - L_o(1-\alpha) - \sum_{t=1}^{T-1} L_t + \alpha \sum_{t=1}^{T-1} L_t + \sum_{t=1}^{T} [O_t(1-\alpha)-\alpha D_t] \qquad (2)$$

where O_t = operating expenses in period t, which would otherwise be incurred, but which are avoided if the lease contract is accepted;[4]

D_t = depreciation expense not applicable under lease financing, but for which tax deductability was assumed in the calculation of (1);
α = company tax rate.

In expression (2) the initial lease payment in period $t=0$ has been separated from the subsequent lease payments to bring out the equivalence of the payment series $L_1, L_2, \ldots, L_{T-1}$ to a repayment series arising from a loan taken out at $t=0$. For simplicity tax deductions are assumed to be applicable without lag. The illustrative example in section III utilises the more realistic assumption of a one period lag.

In a borrow and purchase plan the firm borrows an amount M_o in period $t=0$ and incurs an obligation for a series of payments $B_1, B_2, \ldots, B_{T-1}$. In order to put the borrow and purchase plan on an equivalent basis the loan repayments must equal the lease payments in periods $t=1, 2, \ldots, T-1$. With this uniformity of payment streams the two options are on a strictly comparable basis – each option utilises the same portion of the firm's borrowing capacity and restores it at the same rate during the period from $t=1$ to $t=T-1$.

The loan repayment in any period t, B_t, has two components, R_t, the repayment of part of the principal amount of the loan, and I_t, the payment of interest on the balance outstanding at the beginning of the period, i.e. $B_t = R_t + I_t$.

With the firm paying interest at rate r on its borrowings the amount M_o, which the firm can borrow and repay with $B_t = L_t$ for $t=1, \ldots, T-1$, is given by

$$M_o = \sum_{t=1}^{T-1} \frac{L_t}{(1+r)^t}$$

Thus the relevant cash flows for comparison against the lease option are:

$$\sum_{t=1}^{T} Y_t + M_o - C_o - \sum_{t=1}^{T-1} B_t + \alpha \sum_{t=1}^{T-1} I_t \qquad (3)$$

For simplicity, expressions (2) and (3) assume a zero scrap value for the asset after T periods of operation, and also that accumulated depreciation charges equate to C_o at $t=T$. The argument is not affected by relaxation of these assumptions and the illustrative example (in the following section) introduces the minor complications involved.

Expressions (2) and (3) contain $\sum_{t=1}^{T} Y_t$ in common, and as $L_t = B_t$ for $t=1, 2, \ldots, T-1$, the unique cash flows relevant to the comparison of the two options are as follows:

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[4] The assumption that O_t is incurred at the end of the period is consistent with the general treatment of benefits and outlays in the model. An alternative assumption that O_t is incurred at the beginning of the period may be more realistic in some circumstances, *e.g.* where the firm intends to enter into a repairs and maintenance contract in each period which requires payment in advance.

Lease option

$$-L_0(1-\alpha) + \alpha \sum_{t=1}^{T-1} L_t + \sum_{t=1}^{T} [O_t(1-\alpha) - \alpha D_t] \tag{4}$$

Purchase plan

$$M_0 - C_0 + \alpha \sum_{t=1}^{T-1} I_t \tag{5}$$

Both sets of cash flows include financing costs, so that an evaluation of alternatives by discounting at the weighted average cost of capital would involve a form of double counting. To an investor in the firm's shares, the cash flows identified in (4) and (5) represent the only differences in the alternate plans. An investor would prefer the firm to adopt the option for which the cash flows discounted at the shareholders' required rate of return on equity (i.e. the cost of equity capital, k_e) yield the higher net present value. The relevant net present value formulations are thus:

Lease option

$$-L_0(1-\alpha) + \alpha \sum_{t=1}^{T-1} \frac{L_t}{(1+k_e)^t} + \sum_{t=1}^{T} \frac{O_t(1-\alpha) - \alpha D_t}{(1+k_e)^t} \tag{6}$$

Purchase plan

$$M_0 - C_0 + \alpha \sum_{t=1}^{T-1} \frac{I_t}{(1+k_e)^t} \tag{7}$$

The selection criterion can be stated simply. The lease option should be accepted if (6) > (7); if (7) > (6) the lease option should be rejected; and, if (6) = (7) shareholders could be expected to be indifferent to the method of asset acquisition.

Two main features distinguish the above method of lease evaluation from previously published analyses of the problem. The first feature is the inclusion of a borrowed amount in the loan alternative which is based on identical contractual obligations to those in the lease option rather than on the purchase price of the asset. With

$$M_0 = \sum_{t=1}^{T-1} \frac{L_t}{(1+r)^t},$$ then (ignoring taxes) one of the following relations must hold at $t=0$:

$$M_0 < C_0 - L_0 \tag{8}$$

$$M_0 = C_0 - L_0 \tag{9}$$

$$C_0 - L_0 < M_0 < C_0 \tag{10}$$

$$M_0 \geq C_0 \tag{11}$$

If (8) holds then the firm would require additional funds on hand in period $t=0$ under the loan alternative than under the lease option. If (9) applies then funds requirements in period $t=0$ are the same under both options. If (10) holds then the firm raises a loan greater than is necessary to cover the asset purchase price, given that the funds required for L_0 are available. In the case of (11) the firm would have surplus funds equal to or greater than L_0 in the initial period. In cases (10) and (11) the firm could invest the surplus funds to earn a return at or greater than rate k_w. But if investment opportunities were so limited that internal investments promising returns equal to or greater than k_w were not available to the firm, then funds should be invested in external opportunities, which offer the same return and quality of earnings as those offered by the company's assets.[5]

Secondly, the analysis brings out the theoretical validity of deriving the net present values of the two alternative incremental flows by discounting at the equity capitalisation rate. The justification for this approach lies in the stated objective of the firm – the maximisation of the value of the outstanding shares. If firms are to make decisions which are consistent with this objective then the discount rate employed in the comparison of financing alternatives must be the same rate which the market uses in valuing the expected returns to shareholders.

III An Illustrative Example

The following problem is used to illustrate the approach advocated in this paper.

On the basis of a normal capital budgeting evaluation using the firm's weighted average cost of capital as the discount factor, a firm has decided to acquire a computer that has a purchase price of $1,600,000 including cost of installation.

Annual maintenance and repair expenses of $40,000 would be incurred if the computer were purchased. The estimated life of the computer is 5 years with an estimated residual sale value of $300,000 at that time. Depreciation for tax purposes would be 15% (straight line) and company tax rate is 50%, payable in the year following the year of income. Any profit (loss) on sale would be taxable (tax deductible). The firm can borrow funds at 8%. The cost of equity capital is estimated at 20%.

The firm has been offered a five year lease, which includes maintenance and repairs, and contractual obligations associated with the lease are as follows:

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[5] E. Solomon, *The Theory of Financial Management* (New York: Columbia University Press, 1963) p. 53.

End of year	*Lease payment* \$
0	500,000
1	500,000
2	400,000
3	400,000
4	300,000

The present values of the unique cash flows in (6) and (7) in the previous section are derived from a sequential analysis which stems from the capital budgeting decision criterion. The differential cash flows associated with each alternative can be obtained by deducting the last term in (6) from expressions (6) and (7). The present values of these differential cash flows, PV_L and PV_B respectively, can then be expressed:

$$PV_L = -L_0(1-\alpha) + \alpha \sum_{t=1}^{T-1} \frac{L_t}{(1+k_e)^t} \qquad (12)$$

$$PV_B = M_0 - C_0 + \alpha \sum_{t=1}^{T-1} \frac{I_t}{(1+k_e)^t} - \sum_{t=1}^{T} \frac{O_t(1-\alpha) - \alpha D_t}{(1+k_e)^t} \qquad (13)$$

Expressions (12) and (13) require modification for application to the illustrative problem which includes a loss on asset disposal if it is purchased and a one period lag between expense occurrence and the receipt of the corresponding tax benefit. Introducing the required adjustments:

$$PV_L = -L_0 + \frac{\alpha}{1+k_e} \sum_{t=0}^{T-1} \frac{L_t}{(1+k_e)^t} \qquad (14)$$

$$PV_B = M_0 - C_0 + \frac{\alpha}{1+k_e} \sum_{t=1}^{T-1} \frac{I_t}{(1+k_e)^t} - \sum_{t=1}^{T} \frac{O_t}{(1+k_e)^t} + \frac{\alpha}{1+k_e} \sum_{t=1}^{T} \frac{O_t + D_t}{(1+k_e)^t} + \frac{S - \frac{\alpha}{1+k_e}\left(S - C_0 + \sum_{t=1}^{T} D_t\right)}{(1+k_e)^T} \qquad (15)$$

where S = expected proceeds from asset disposal at t=T.

The present value at 20% of the expected differential cash flows under the lease plan is \$154,415.

In this example $M_0 = \sum_{t=1}^{4} \frac{L_t}{(1 \cdot 08)^t}$, or \$1,343,930, which is less than C_0 (= \$1,600,000) but greater than $C_0 - L_0$ (= \$1,100,000), so that relation (10) holds and the optimal borrow and purchase plan is a loan of \$1,343,930 taken at time t=0 and supplemented by a cash expenditure of the balance of the purchase price (\$256,070).

The present value at 20% of the expected differential cash flows under the purchase plan is \$186,556. The purchase option is thus more favourable than the lease option.

An incorrect and misleading evaluation of the alternatives can result from a comparison of a sub-optimal purchase plan with the lease option. Consider, for example, a financing plan which incorporates a loan limited to the amount of the purchase price and with repayments proportional to the lease payments, as suggested by Bower, Herringer and Williamson.[6] The loan repayments under such a plan in the example presented are shown in Table 3.

The effects on the net cash flows of Table 2 from the use of this sub-optimal purchasing plan are summarised in Table 4.

TABLE 1
Expected differential cash flows under lease plan

(\$'000)

End of year	*0*	*1*	*2*	*3*	*4*	*5*
Lease payments	−500					
Tax shield		250	250	200	200	150
Net cash flows	−500	250	250	200	200	150

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[6] op. cit.

TABLE 2
Expected differential cash flows under optimal purchase plan

($'000)

End of year	*0*	*1*	*2*	*3*	*4*	*5*	*6*
Initial outflow	−256						
Maintenance and repairs		−40	−40	−40	−40	−40	
Proceeds of sale						300	
Tax shield on:							
(a) Loan interest			54	38	25	11	
(b) Maintenance and repairs			20	20	20	20	20
(c) Depreciation			120	120	120	120	120
(d) Loss on sale							50
Net cash flows	−256	−40	154	138	125	411	190

TABLE 3
Proportional loan repayments on $1,600,000 at 8 per cent

($'000)

End of year	*Lease payments*	*Loan repayments*
0	500	434
1	500	434
2	400	347
3	400	347
4	300	260
Present value at 8%	1,864	1,600

The present value at 20% of the resultant net cash flows in the final column of Table 4 is $140,317 which, when compared with $154,415 for the lease plan, incorrectly suggests that leasing is more favourable than the borrow and buy alternative.

IV Conclusion

The proposition advanced in this paper is that there are three steps in the analysis leading to the decision to accept or reject a financial lease. First, the decision to acquire the asset must be taken on the basis of a conventional capital budgeting analysis. Secondly, the subset of the firm's total cash flows unique to acceptance of the financial lease and the subset unique to an alternative financing plan imposing identical contractual obligations must be isolated. Finally, the net present values of these unique cash flows must be calculated using the equity capitalisation rate as the discount factor.

The first step accords with accepted theory and requires no formal justification here. The second step permits a comparison of net present values in a framework in which the time profiles of the firm's capital structure and borrowing capacity are held constant. With the exception noted in footnote 3, lease evaluation proposals in the extant literature result in comparisons in which the repayment obligations under the alternative financing plan differ from those in the leasing option, e.g. Bower, Herringer and Williamson.[6] Such approaches introduce avoidable bias in the analysis.

The use of the equity capitalisation rate to discount the differential cash flows follows logically from the assumption that the firm acts in the best interests of its shareholders. The assumptions in section II were framed so that the equity capitalisation rate was insensitive to the method of asset acquisition. It is contended that, for the general case, this is an appropriate assumption. It is possible, however, that

TABLE 4
Effects of sub-optimal purchase plan on net cash flows

($'000)

End of year	*Net cash flows in Table 2*	*Increased initial outlay*	*Reduction in loan payments*	*Reduction in tax shield*	*Resultant net cash flows*
0	−256	−178			−434
1	−40		+66		26
2	154		+53	−7	200
3	138		+53	−5	186
4	125		+40	−3	162
5	411			−2	409
6	190				190

shareholders do not regard lease payment obligations as equivalent to debt repayment obligations of equal size and timing. The equity capitalisation rate if the lease option was adopted then may differ significantly from the rate resulting from the alternative financing plan. Such a possibility changes the whole complexion of the lease evaluation problem and no solution is offered for this special case.

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Hospital Investment Evaluation

Edward J. Lusk

Introduction

Institutions responsible for the delivery of health care services have experienced rapidly increasing costs which in large measure are traceable to an expanding technology base.[1]

Effective control over the resource allocation function in these institutions is basic to containing costs.[2] However, in the health care industry investment evaluation is a complex process which is largely unresolved and has not been effectively used in controlling institutional costs.

Given the above orientation, this paper is addressed to suggesting a normative investment evaluation system which will enable those responsible for the allocation of hospital resources to differentiate among alternative investments based upon their relative contribution to achievement of the various levels of hospital goals.[3] To introduce this model, we shall briefly discuss the role orientation of the two decision making groups – physicians and administrators.

Hospital Decision-Maker Role Interactions

The hospital is primarily a physical structure, whose facilities are utilised by physicians to practise those aspects of the medical profession requiring a medical technology uneconomically provided by an individual physician. As the group of physicians utilising the hospital grew, resulting in increased administrative responsibilities, the administrative function became fixed with the hospital's lay administration. Their charge was to maintain the financial records and monitor the billing of hospital services.[4]

Over the years the administrative group has been increasingly concerned with information and statistical reporting requirements. The physician group has maintained primary decision responsibility for setting policy as it relates to teaching, research and health care delivery. An operational reality resulting from the physician's policy control has been a physician dominance of the resource allocation function. Consequently hospital investments are primarily evaluated along medical dimensions; rarely are economic considerations integrated into the investment evaluation function.[5]

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[1] Kovner, Anthony R. and Lusk, Edward J., 'Effective Hospital Budgeting: Capital Budgeting and Operational Budgeting,' forthcoming in *Hospital Administration.*

[2] Resource allocation is addressed to selection of those investments or projects which best move the organization toward achievement of its goals.

[3] Investments (and projects) are defined as any technology (or activity) requiring a substantial commitment of funds.

[4] Rosen, G., 'The Evolution of Social Medicine,' *Handbook of Medical Sociology*, eds., Freeman, Levine and Reeder (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963) p. 36.

[5] The insights required to characterize the medical and administrative interactions were based upon interviews with physicians and administrators. The population from which the sample was selected consisted of the non-profit, 300–400 bed hospitals in a major eastern city in the United States. There were seven such hospitals of which four were randomly selected for study. The sample size was maintained at three institutions owing to the researcher's belief, after conducting interviews at the first hospital, that three hospitals was a sufficient sample to deal adequately with the questions posed in the study. Hospitals with 300–400 beds were selected because they were large enough to have one or more specialists handling the budgeting function and yet small enough to be representative of a substantial number of hospitals. The three study hospitals selected were organized and functioned as separate entities, even though two of the study hospitals were components of larger medical centres. The information needed to conduct the research was gathered through interviews with the following hospital personnel:

(a) two members of the executive committee of the board of trustees,
(b) two members of the executive committee of the medical staff,
(c) the hospital administrator,
(d) the controller, and
(e) four department heads: radiology, nursing, housekeeping, and dietary.

The reason for presenting this brief characterisation of the physician/administrator interaction is to suggest the nature of the behavioral environment as it acts upon the resource allocation process. The normative evaluation system to be described may provide an evaluation process (none now seems to exist) to encourage decisions to be made in recognition of the objectives and constraints of both physicians and administrators, i.e., a unifying process.

Investment Evaluation

The medical bias permitted by the hospital's decision structure complicates the investment evaluation process. Additional complications result from the difficulty in developing (1) generally agreed upon effectiveness measures, (2) standards of performance, and (3) a definition of the output of the hospital system.

Given these bias and measurement complications, the traditional approach of evaluating investment proposals solely on the basis of profitability criteria has not been found relevant to hospital allocation problems.

To fill this evaluation void, PPB (Planning, Programming and Budgeting) techniques have been suggested. According to Schick:

> PPB aspires to create a different environment for choice. Traditionally, budgeting has defined its mission in terms of identifying the existing base and proposed departures from it – 'this is where we are; where do we go from here?' PPB defines its mission in terms of budgetary objectives and purposes – 'where do we want to go? What do we do to get there?' PPB reverses the informational and decisional flow (relative to the traditional budget systems). Before the call for estimates is issued, top policy has to be made, and this policy constrains the estimates prepared below.[6]

Given the inapplicability of strict profitability models and to enrich the PPB structure, we suggest incorporating in the PPB hierarchical ordering of goals, a relevance model[7] which would:

1 Establish evaluation guidelines for the organisation's investment activities,

2 Enable proposed investment activities to be analysed along objective and subjective evaluation guidelines,

3 Provide investment weightings to establish an estimation of the contribution of investment activities to satisfying the mission of the hospital.

The Relevance System

To facilitate the exposition of the relevance system, the following organisational model and terminology is suggested:

Organisational Model: An autonomous hospital where demands for funds to support investment activities exceed the supply of funds. It shall be assumed that there are three hierarchical levels relative to investment evaluation – general, program and investment activities. We shall refer to these activity levels as decision levels.

Mission: A generalised welfare specification. A condition which is desirable according to the value systems of those in the hospital.[8]

General Activities: A statement of major institutional functions which result from programs (major groupings of technology) supported by investment activities. The general activities are the mission support activities. For example, a general activity at the study hospitals was teaching.

Program Activities: The *groupings* of technology and related staff which in total support the various general institution activities. For example, each of the study hospitals had an intern/extern training program, which, in part, supported the general activity – teaching.

Investment Activities: Specific capital projects (and the staff required to operationalise them) suggested by members of the hospital.

Evaluation Guidelines: A set of qualitative and/or quantitative descriptive statements used to evaluate each of the activities in the PPB hierarchy. For example, 'Provision for Patient Welfare' may be an evaluation guideline useful in relating various general activities (i.e., Health Care Delivery, Teaching and Research) to each other.

The relevance system's orientation is to take the PPB hierarchy of activities and (1) weight each decision level's evaluation guidelines relative to achievement of the mission, and (2) weight the general, program, and investment activities as they relate to the evaluation guidelines. The output of the relevance system for *n* investments is a set of *n* relevance values which reflect the investment's relative contribution to achievement of the institution's mission.

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[6] Schick, Allen, 'The Road to PPB: The Stages of Budget Reform,' *Public Administrator Review*, 26, No. 4, December 1966. pp. 257–258.

[7] Relevance modelling, which is specified and illustrated in the next section of this paper, represents a framework within which subjective evaluation criteria may be incorporated in a PPB system. See:
Haggart, S. A. *et. al.*, 'Program Budgeting for School District Planning: Concepts and Application,' Rand Corporation, November 1969, Rand No. RM-6116-RC.
Marshall, A. W., 'Cost/Benefit Analysis in Health,' Santa Monica, California: *The Rand Corporation*, December 1965, Rand No. P-3274.
Quade, E. S., 'Military Systems Analysis,' Santa Monica, California: *The Rand Corporation*, January 1963, Rand No. RM-3452-PR.

[8] In a regional system, the hospital, as a part of the regional complex, may have its mission established by the central planning authority of the regional group.

In order to simplify the weighting process, we suggest two recording techniques:

A Relevance Matrix, and
A Relevance Lattice.

Relevance Matrix

The relevance matrix for a particular decision level represents the description of *m* evaluation guidelines as row vectors and *n* activities as column vectors. The evaluation guidelines are themselves weighted per their importance in facilitating achievement of the mission. For example, consider the following program level relevance matrix:

Evaluation Guidelines	Mission Weight	Program 1	Program 2	Program --- n
EG_1	MW_1	RW_{11}	RW_{12}	---RW_{1n}
EG_2	MW_2	RW_{21}	RW_{22}	---RW_{2n}
EG_k	MW_k	RW_{k1}	RW_{k2}	---RW_{kn}
EG_m	MW_m	RW_{m1}	RW_{m2}	---RW_{mn}

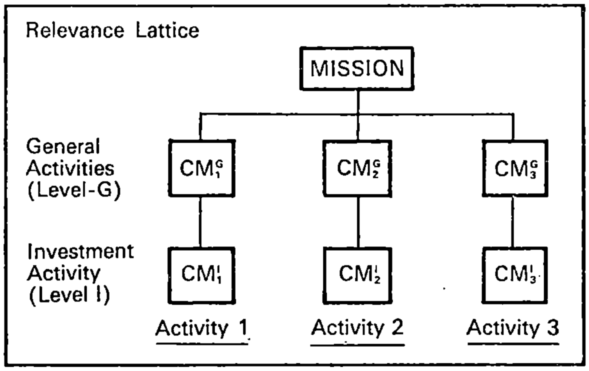
The MW_K weight represents the evaluation guideline EG_K's importance in achieving the institution's mission. The RW_{Kn} weight is the importance of the n*th* activity relative to the k*th* evaluation guideline.

The information contained in the relevance matrix is combined to form the weighting of each activity (at a specific decision level) as it contributes to achievement of the mission (CM). An example is given at the foot of this page.

The contribution of the first Program Activity to the mission is represented by CM_1^P: $CM_1^P = (MW_1^P \cdot RW_{11}^P) + (MW_2^P \cdot RW_{21}^P) + (MW_3^P \cdot RW_{31}^P)$. Each decision level has a relevance matrix and one CM computation per activity. These sets of CM are used to determine the investment's relevance weight. For computational convenience these relevance weights are placed in a lattice called the relevance lattice.

Relevance Lattice

The relevance lattice is a network (hierarchical PPB linkages) whose nodes are horizontally stratified by decision level and vertically stratified by the general, program and investment activity. The relevance *value* per investment activity is found by multiplying the respective CM from the investment activity up through the particular programs and general activities as they support the mission. For example, if we have two decision levels with three general activities and three investment activities for which relevance matrices have been structured so the CM weights have been computed, these weights will be installed in the relevance lattice as follows:



In this simple case[9] with two decision levels (G and I) and one Investment Activity per General Activity the relevance *value* for the activities will be:

Relevance Value: Activity 1 = $CM_1^G \cdot CM_1^I$
Relevance Value: Activity 2 = $CM_2^G \cdot CM_2^I$
Relevance Value: Activity 3 = $CM_3^G \cdot CM_3^I$

Relevance System Information Flows

Now that the elements of the relevance system have

			Program Activity 1	Program Activity 2	Program Activity 3	
Program Activity	EG_1^P	MW_1^P	RW_{11}^P	RW_{12}^P	RW_{13}^P	$\sum_i^3 RW_{1i}^P = 1$
Decision	EG_2^P	MW_2^P	RW_{21}^P	RW_{22}^P	RW_{23}^P	$\sum_j^3 RW_{1j}^P = 1$
Level: P	EG_3^P	MW_3^P	RW_{31}^P	RW_{32}^P	RW_{33}^P	$\sum_k^3 RW_{1k}^P = 1$
		1·0	CM_1^P	CM_2^P	CM_3^P	$\sum_i^3 CM_i^P = 1$

---

[9] A generalized relevance framework is suggested in the Appendix.

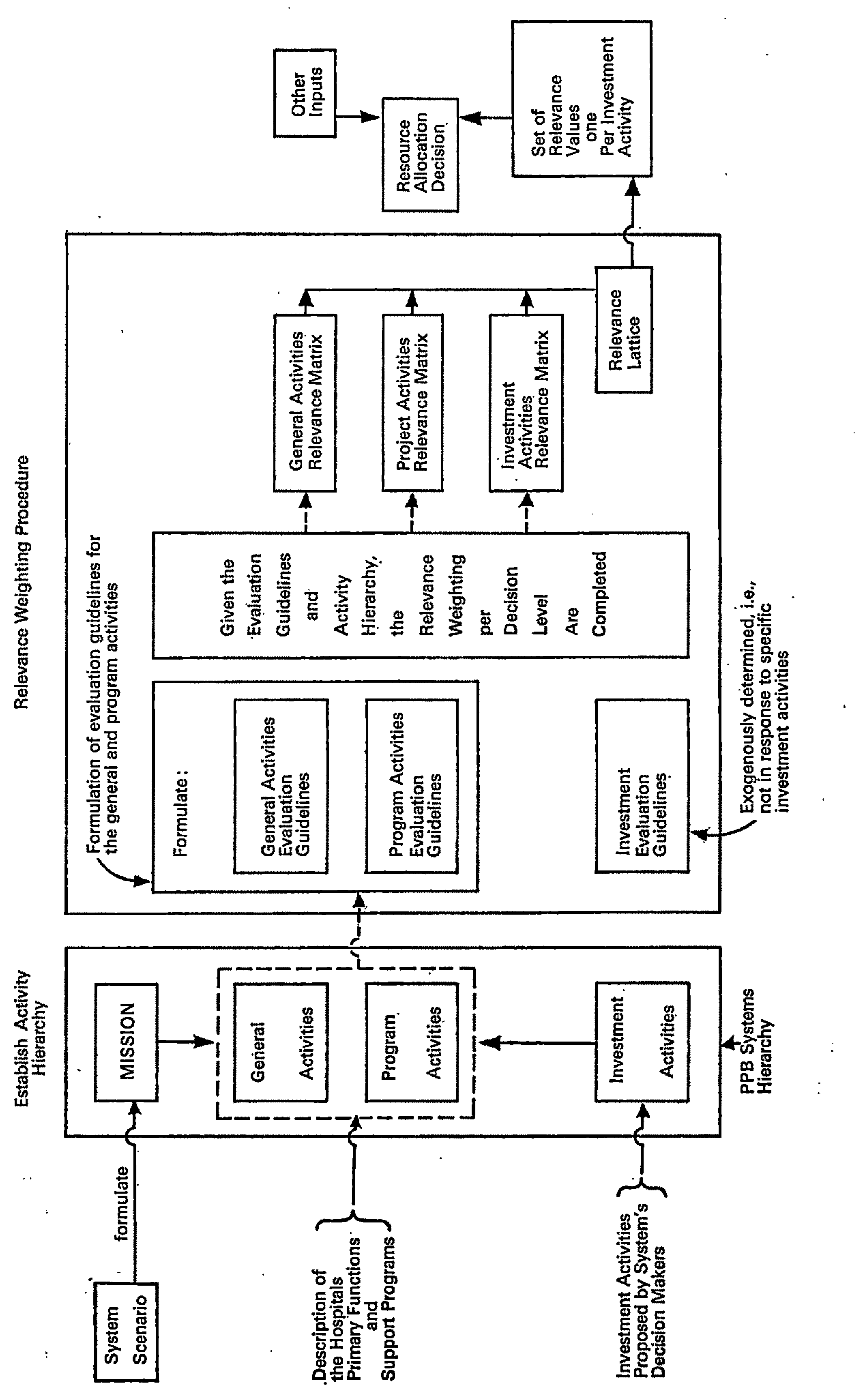

System Scenario
formulate
Description of the Hospitals Primary Functions and Support Programs
Investment Activities Proposed by System's Decision Makers
Establish Activity Hierarchy
MISSION
General Activities
Program Activities
Investment Activities
PPB Systems Hierarchy
Relevance Weighting Procedure
Formulation of evaluation guidelines for the general and program activities
Formulate:
General Activities Evaluation Guidelines
Program Activities Evaluation Guidelines
Investment Evaluation Guidelines
Exogenously determined, i.e., not in response to specific investment activities
Given the Evaluation Guidelines and Activity Hierarchy, the Relevance Weighting per Decision Level Are Completed
General Activities Relevance Matrix
Project Activities Relevance Matrix
Investment Activities Relevance Matrix
Relevance Lattice
Set of Relevance Values one Per Investment Activity
Resource Allocation Decision
Other Inputs

Figure 1 Relevance System Information Flows

been discussed, the information flows will be described. Figure 1 indicates the information flows required in the relevance system.

From the system's scenario[10] the mission of the organisation is developed. Given the mission of the organisation, the general activities which characterise institutional functions are formulated. Each of the general activities is supported by specific programs which relate to the various investment activities. This arrangement of the hierarchical activities is analogous to the activities ordering required in the PPB system.[11] Once the activity dimensions are established, the evaluation guidelines are developed for each level. These evaluation guidelines are used to derive the contribution of each decision level (general, program, and investment activities) to the achievement of the mission. These evaluation guidelines may be addressed to quantitative and/or qualitative measures of the operating character of that decision level.

Having completed the activity dimensions and their related evaluation guidelines, the skeletal structure of the relevance matrix for each decision level is complete. The next task is to establish the relevance weightings for each decision level. This weighting procedure is best illustrated with an example.

Relevance Weighting: A Procedural Suggestion

A central issue in the evaluation provided by the relevance analysis is the constitution of the group of individuals responsible for determining the skeletal structure as well as the various weightings used in the relevance analysis. The behavioral decision bias which may enter the weighting will be discussed subsequently; in this section our interest is in the technical dimension of relevance weighting.

Consider the relevance matrix for the General Activities level (Level G). Assume it has been determined that two evaluation guidelines best characterise the general activities. If EG_1^G is four times as important in achieving the hospital's mission as EG_2^G, the mission weights (MW_1^G, MW_2^G) will be as shown at the head of the next column.

Evaluation Guidelines	Mission Weight	
EG_1^G	MW_1^G	·8
EG_2^G	MW_2^G	·2
		1·0

The relevance matrix entry for the general activities will be the relationship of each general activity to the evaluation guidelines. The weighting per evaluation guideline is translated to a unit interval (i.e., evaluation guideline weights across the general activities each sum to 1·0). The ranking rule for activities is that they are ranked per EG^G based upon their relationship to the evaluation guideline. For example, if the general activities (GA_1^G, GA_2^G, GA_3^G, GA_4^G) per EG_1^G are ranked so that GA_1^G, GA_2^G are equally important and are each four times as important as GA_3^G, GA_4^G which are of equal importance, the general activities weighting will be {·4 ·4 ·1 ·1}.

This entry in the general level relevance matrix will be:

General Activities					
Evaluation Guidelines	Mission W Weights	GA_1^G	GA_2^G	GA_3^G	GA_4^G
EG_1^G	·8	·4	·4	·1	·1
EG_2^G	·2	—	—	—	—

Note that the weighting of the general activities per evaluation guideline does not depend upon the mission weighting of the evaluation guidelines.

Referencing the above definitions and the information flows as they have been represented in Figure 1, we will present a comprehensive example of the operation of the relevance evaluation system.

Relevance Setting: An Illustration[12]

Assume[13] that the mission of the hospital is to *utilise scarce hospital resources to deal best with local health problems*. Also there are three investments to be analysed:

- Investment in new medical classroom equipment;
- Acquisition of an electronic analogue/digital computer system, and
- Start a Health Maintenance Organisation (HMO).

Supporting that mission are the following two decision levels:

The General Level Activities – Level G

There are three institutional activities supporting the mission.

1. Teaching;
2. Research;
3. Health Service Delivery.

The Program Level Activities – Level P

1. Intern/Extern training;

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[10] A probing of the internal and external environment in order to understand the desired expansion path of the organization.

[11] Deniston, Lynn O. *et. al.*, 'Evaluation of Program Effectiveness and Program Efficiency,' in *Planning Programming and Budgeting – A Systems Approach to Management*, eds. Fremand J. Lyden and Ernest S. Miller (Chicago, Markham Publishing Company, 1972).

2. Develop general research competence (rather than categorical program research such as heart research, etc.);
3. Extend care into the community.

These Program Level Activities are a subset of the activities of the hospital. Which program level activities are included depends upon the investment activities to be analysed. Recall that the purpose of the relevance matrix is to evaluate specific investment's relative contribution to the mission of the hospital. For example, if the proposed investment activities do not relate to specific programs such as a Cardiovascular/Pulmonary Research Unit Program, there is no reason to include that program activity.

At the general level, the evaluation guidelines suggested to generate the general level relevance matrix are:

Provide for patient welfare – EG_1^G
Contribute to the status of the hospital – EG_2^G
Establish a fund generating potential – EG_3^G
Provide resource control effectiveness[14] – EG_4^G

In relating these evaluation guidelines to the hospital's mission, the following information is derived:

EG_1^G is most important – twice as important as EG_3^G which is twice as important as EG_2^G. EG_4^G is not as important as EG_1^G but more important than EG_3^G.

Given this information and the restriction that the mission weights sum to 1·0 (i.e., a convex combination on the unit interval), the following mission weights are determined:

	Mission Weight
Provide for patient welfare – EG_1^G	·4
Resource control potential – EG_4^G	·3
Fund generation potential – EG_3^G	·2
Status of the hospital – EG_2^G	·1
	1·0

Next, the relevance weights for the general activities *per* evaluation guidelines are determined. The same ranking procedure, ascertaining the ordering and magnitude of weights, is used to determine the specific relevance weighting (which sum to one across activities per evaluation guideline). For example, considering Providing for Patient Welfare, those responsible for weighting the general activities ascertain that Health Care Delivery is four times more important than Teaching and Research which are equally important in Providing for Patient Welfare (EG_1^G). Therefore, the General Activities Teaching, Research and Health Care Delivery contribute to EG_1^G as follows:

		Teaching	Research	Health Care Delivery
EG_1^G	·4	·1	·1	·8

Similar relevance rankings would be done for each of the evaluation guidelines across activities, the result being the following general level relevance matrix – Figure 2.

Vector product: Teaching	Vector Product: Research	Vector product: Health Care Delivery
·04	·04	·32
·21	·06	·03
·06	·12	·02
·01	·01	·08
·32	·23	·45

Recognising the investment activities, the various programs are delineated as they support the general objectives. The program activities in service of the general activities are:

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[12] The description of the decision levels and establishment of the three levels' evaluation guidelines as well as the relevance weighting were formulated by ten second year Health Care Administrative graduate students. Five of the students were in the role of physicians and five were cast in the role of administrators. The institutional setting was that portrayed in the Mansfield Case (Harvard Case Studies: 9-171-610). Therefore, the use of specific investment guidelines or generalized hospital functions is not intended to represent a synthesis of the functions of the study hospitals (see footnote 5). Nor should they be interpreted as normative or suggestive of anything other than an illustration of the relevance system's operation. For an excellent discussion of goal setting see Carrol, S. J. Jr. and Tosi, H. L. 'A Study of the Goal-Setting and Review-Process in a 'Management by Objectives' System,' *Public Personnel Service*, Vol. 35 No. 3, July 1971, pp. 172–182.

For a description of various sets of physician/administrator goals see:

Akula, William G. and Vora, Jay A., 'Hospital Hierarchical Goals: Validation and Reliability of Mail Survey,' Paper presented at the 1972 Joint National Conference of ORSA/TIMS/AIIE, Atlantic City, 1972.

Vora, J. A. and Akula W. G., 'Empirical Structuring of Hospital Goals – Hierarchy by Medical and Managerial Staffs,' Proceedings of the *American Institute for Decision Sciences*, April, 1972.

[13] Throughout this example the activity hierarchy and related evaluation guidelines are assumed to be derived from a balanced interaction of physician and administrator. This assumption, which is unrealistic in light of role interaction as represented in the physician/administrator characterization, is subsequently relaxed when the effect of physician (or one interest group) role dominance is discussed.

[14] Resource Control Effectiveness was defined by the role playing group as the extent to which funds once committed to achievement of a given activity may be shifted into other programs (in support of other activities) in response to feedback that (1) health priorities have changed, or (2) the benefits of the resource use are not being realized.

Figure 2 GENERAL LEVEL

Evaluation Guidelines EG^G		Mission Weights CM	General Activities		
			Teaching	Research	Health Care Delivery
EG^G_1	Provide for Patient Welfare	·4	·1	·1	·8
EG^G_2	Resource Control Potential	·3	·7	·2	·1
EG^G_3	Fund Generation Potential	·2	·3	·6	·1
EG^G_4	Status of the Hospital	·1	·1	·1	·8
		1·0			
Entry on Relevance Lattice—General Level			·32	·23	·45

PA1 – Provide an educational environment within the hospital that permits interns and externs to receive valuable educational experiences;

PA2 – Develop general research competence, and

PA3 – Provide quality care to that segment of the patient population which is in the hospital catchment area, but does not ordinarily present itself to the clinics maintained by the hospital.

Given the program activities, the following four evaluation guidelines are suggested as being representative of and sensitive to characteristics of the program activities:

EG^P_1 – Program Achievement within one year with existing personnel;

EG^P_2 – Continuity of fund flow (State, Federal and Philanthropy);

EG^P_3 – Provide an environment attractive to eminently qualified physicians.

The mission weighting of these three Program Level evaluation guidelines is:

EG^P_1: ·5
EG^P_2: ·3
EG^P_3: ·2
1·0

After each of the evaluating guidelines is used to determine the relevance weight per program activity, the Program Level Relevance Matrix is complete – Figure 3.

Figure 3 Relevance Matrix
Program Level—P

Evaluation Guidelines EG^P		Mission Weights CM	Intern/Extern Training	Develop Research Competence	Extend Care into the Community
EG^P_1	Program Achievement Within One Year	·5	·1	·1	·8
EG^P_2	Continuity of Fund Flow	·3	·1	·2	·7
EG^P_3	Attractive Physician Environment	·2	·2	·7	·1
		1·0			
Entry on Relevance Lattice			·12	·25	·63
			Vector Product Physician Training	Vector Product Research	Vector Product Extended Care
			·05 ·03 ·04	·05 ·06 ·14	·40 ·21 ·02
			·12	·25	·63

The first two decision levels (General and Program) are the basis for formalising the evaluation guidelines. At the investment activity analysis level, however, generalised evaluation guidelines are formulated unrelated to the specific projects to be evaluated.[15]

The generalised (i.e., not specified by the particular set of investments) investment activity guidelines and the mission weighting suggested to evaluate the various investment activities are:

EG^I_1 – Yearly Economic Return (revenue over direct cost) ·1
EG^I_2 – Potential to Increase Hospital Utilisation ·6
EG^I_3 – Ability to validate the proposed benefits prior to fund commitment ·3
1·0

Investment Evaluation: The relevance system is now 'parameterized'[16] and may be used to evaluate the proposed investment activities:

IA_1 – Investment in new medical classroom equipment;
IA_2 – Acquisition of an electronic analogue/digital computer system to support scientific research; and
IA_3 – Start a Health Maintenance Organisation (HMO)

Given these investment activities and the evaluation guidelines (EG^I_1, EG^I_2, EG^I_3), relevance weights may be computed for the investment activities level. Assume those responsible for relevance weighting the investment activities determine the relevance weights which are represented in Figure 4.

Investment Evaluation: Relevance Values

If the three investments are evaluated solely on their relationship to the investment activity evaluation guidelines, (even this dimension was lacking in the study hospital's evaluation systems), the relevance

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[15] In situations where the General and Program Activities are unique to an institution they will serve as the discussion construct from which the evaluation guidelines may be derived.

[16] Parameterized in this context refers to establishing the relevance system so that investment activities may be evaluated.

Figure 4 Relevance Matrix
Investment Activity Level

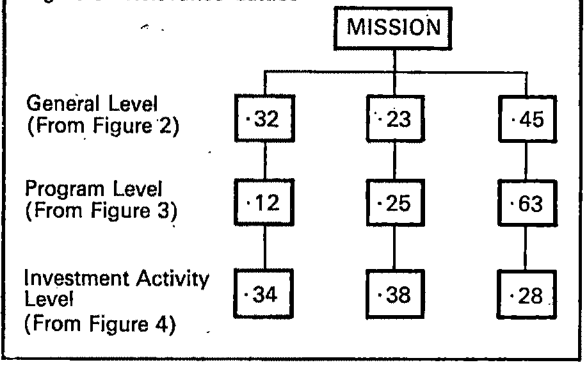
		Investment Activities		
Evaluation Guidelines EG'	Weights Contribution to Mission	Investing in new medical classroom equipment IA_1	Acquisition of computer system IA_2	Starting a Health Maintenance Organization (HMO) IA_3
EG'_1 Yearly Economic Returns (Revenue over direct cost)	·1	·1	·2	·7
EG'_2 Increase Hospital Utilization	·6	·4	·5	·1
EG'_3 Ability to validate the proposed benefits prior to fund commitment.	·3 1·0	·3	·2	·5
Entrance on the relevance lattice—Investment Activity Level		·34	·38	·28
		Vector Product Classroom	Vector Product Computer System	Vector Product HMO
		·01	·02	·07
		·24	·30	·06
		·09	·06	·15
		·34	·38	·28

weighting[17] for these investments would be:

IA_1 = Medical Classroom Equipment = ·34
IA_2 = Electronic Computer System = ·38
IA_3 = HMO = ·28

However, by utilising the relevance lattice, Figure 5, the three investment activities may be evaluated on their contribution through the decision levels relative to the mission of the hospital.

Figure 5 Relevance Lattice


MISSION
General Level (From Figure 2)
·32
·23
·45
Program Level (From Figure 3)
·12
·25
·63
Investment Activity Level (From Figure 4)
·34
·38
·28

The relevance values (stated in whole numbers on a 1-10 scale) derived from the relevance lattice are:

	Project		Specific Level		General Level		Relevance Value
Project 1 =	·34	*	·12	*	·32	=	1·31
Project 2 =	·38	*	·25	*	·23	=	2·19
Project 3 =	·28	*	·63	*	·45	=	7·94

Therefore, although Investment Activity 3 is considered least important at the investment activity level, it turns out to have the greatest relevance value when considering all the decision levels. These values may then be used to determine the actual allocation of capital resources. See Figure 1.

Relevance Evaluation in an Unbalanced System

Prior to discussing the relevance evaluation model, we indicated there existed a decision bias in favour of the system's medical objectives. Two reasons were suggested for this bias: (1) The employer (professional)/employee (layman) relationship as represented in the hospital system, and (2) the erroneous presumption that the nature of hospital operations does not permit evaluation of hospital activities. Relevance evaluation is addressed to correcting the measurement aspects of investment evaluation. Establishing relevance values is a necessary, but not a sufficient, condition to correct the roles aspect of the decision bias. The reason for this is that if those responsible for formulating the evaluation guidelines and defining the hospital's mission, general and program activities represent only a special interest (i.e. an unbalanced system), the traditional resource allocation bias will merely be formalised. In order to balance the hospital system through the relevance system, it is suggested that committees be formed and charged as follows:[18]

Committee arrangement	*Charge*
Committee 1	Describe the mission of the hospital
Committee 2	Describe the general activities and respective evaluation guidelines
Committee 3	Describe the program activities and respective evaluation guidelines
Committee 4 – (Including those proposing projects)	Establish the investment activity evaluation guidelines.

These committees may then also be used to establish the relevance weights for each decision level.

The relevance system attempts to capture the attitudes, personal value systems and biases of the physician and administrator. The 'relevance record-keeping' may provide an impetus (in an *ex-post* auditing sense) to restoring the managerial balance relative to resource allocation. However, it must be pointed out that no 'bias-correctional' attributes can be guaranteed by the relevance evaluation system, though it does represent an opportunity to reorient the medical/administrative system. It is hoped that these committee arrangements and the relevance interactions therein implied will sensitise the physician/administrator groups to each other's objectives and constraints as they relate to the institution's objectives and constraints. It should be noted that if one group refuses to cooperate with the spirit of the relevance of analysis – which is to cooperate in attempting to analyse activities contribution to the mission of the hospital – the relevance system may raise the level of conflict and in some cases further polarise the groups responsible for the activity analysis. However, if the groups continue to disregard the cost consequences of an unbalanced system, the survival of the institution may be at issue. Recognising the survival perspective may provide a persuasive argument to adopting a comprehensive evaluation system like the relevance system.

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[17] From Figure 4.
$IA_1 = (·1)(·1) + (·6)(·4) + (·3)(·3) = ·34$
$IA_2 = (·1)(·2) + (·6)(·5) + (·3)(·2) = ·38$
$IA_3 = (·1)(·7) + (·6)(·1) + (·3)(·5) = ·28$

[18] In the role playing exercise this committee arrangement and charge was used to develop the relevance structure. The students required six hours over three days to complete the exercise.

Conclusion

The relevance values attached to investment proposals represent the translation of the mission weighted evaluation guidelines and the objectives as they relate to the evaluation guidelines. These weighting combinations reflect not only the hierarchical PPB ordering but the process of negotiation between those responsible for formulating the criteria and their subsequent relevance weighting. In the normative relevance model suggested it was assumed that representative groups of the institution had interacted to form the various relevance weights at the decision levels. If the relevance weightings are done by decision groups constituted of physicians and administrators, the relevance system represents a potential to balance the biased physician/administrator decision system regarding the allocation of resources.

If the physicians continue to dominate resource allocation decisions by establishing only medically oriented evaluation guidelines and disproportionally weighting the medical objectives, the relevance weights will be evidence of that bias. It is the author's opinion that the relevance system represents a process for:

1 Defining what the institution is doing;
2 Measuring the 'relevance' of programs by a common denominator, – contributions to the mission;
3 Screening capital projects based upon the potential contribution of the project to the mission of the hospital, and
4 Raising the level of consciousness about the effect of an unbalanced decision system on the allocation of resources.

Appendix

Generalized Relevance System Assuming Three Decision Levels

Figure A-1

Relevance Matrix—Level L

		GENERAL ACTIVITIES: GA				
General Evaluation Guidelines	Mission Weights	GA_1	GA_2	– – –	GA_m	
EG_1^G	$^{\gamma}1$	$^{x}11$	$^{x}12$	– – –	$^{x}1m$	$\sum_j^m x_{1j} = 1$
EG_2^G	$^{\gamma}2$	$^{x}21$	$^{x}22$	– – –	$^{x}2m$	$\sum_j^m x_{2j} = 1$
⋮	⋮	⋮	⋮	⋮	⋮	⋮
EG_n^G	$^{\gamma}n1$	$^{x}n1$	$^{x}n2$	– – –	^{x}nm	$\sum_j^m x_{nj} = 1$
	1·0	$^{\Phi}1$	$^{\Phi}2$	– – –	$^{\Phi}m$	$\sum_j^m \Phi_j = 1$

Where: $\Phi_k = \sum_j^n \gamma_j {}^* x_{jk}$

Relevance Matrix—Level P

		PROGRAM ACTIVITIES: PA				
Program Evaluation Guidelines	Mission Weights	PA_1	PA_2	– – –	PA_r	
EG_1^P	${}^{\delta}1$	${}^{y}11$	${}^{y}12$	– – –	${}^{y}1r$	$\sum_i^r y_{1i}$
EG_2^P	${}^{\delta}2$	${}^{y}21$	${}^{y}22$	– – –	${}^{y}2r$	$\sum_i^r y_{2i}$
⋮	⋮	⋮	⋮	⋮	⋮	⋮
EG_q^P	${}^{\delta}q$	${}^{y}q1$	${}^{y}q2$	– – –	${}^{y}qr$	$\sum_i^r y_{qi}$
	1·0	${}^{\varphi}1$	${}^{\varphi}2$	– – –	${}^{\varphi}r$	$\sum_i^r \varphi_i = 1$

Where: $\varphi_k = \sum_i^q \delta_i{}^* y_{ik}$

Relevance Matrix—Level I

		INVESTMENT ACTIVITY: IA				
Investment Activity Evaluation Guidelines	Mission Weights	IA_1	IA_2	– – –	IA_t	
EG_1^I	ε_1	Z_{11}	Z_{12}	– – –	Z_{1t}	$\sum_k^t z_{1k} = 1$
EG_2^I	ε_2	Z_{21}	Z_{22}	– – –	Z_{2t}	$\sum_k^t z_{2k} = 1$
⋮	⋮	⋮	⋮	⋮	⋮	⋮
EG_s^I	ε_s	Z_{s1}	Z_{s2}	– – –	Z_{st}	$\sum_k^t z_{sk} = 1$
	1·0	θ_1	θ_2	– – –	θ_t	$\sum_k^t \theta_k = 1$

Where: $\theta_k = \sum_j^s \varepsilon_j{}^* z_{jk}$

Where: EG^G, EG^P and EG^I are the general program and investment activity evaluation guidelines respectively.

: γ, δ, ε are the weights reflecting those levels contribution to the mission;

: x, y, z are the weights reflecting the way in which an activity relates to an evaluation guideline;

: Φ, ϕ and θ are weighting of the activities (general, program and investment) per the decision levels G, P, I.

In Figure A-1 there are m + r + t investment activity weights (as there are m + r + t investment activities). Each activity weight is used on the relevance lattice Figure A-2 from which the relevance value (activities weighted through the decision levels) is computed.

In this generalised example, we have illustrated the following three situational linkages:

Direct: IA_t. This investment activity supports only one program which in turn supports only one general objective.

Multiple activities supporting one objective or program: IA_1, IA_2, IA_3, IA_4. These investments share the support of a program or contribute to a program which in conjunction with another program supports a general objective.

Multiple programs supported by one activity: IA_5. This investment contributes to the *full* support of two different programs, PA_4, PA_5. In this case IA_5 is weighted by ϕ_4 and ϕ_5. If the investment were to make partial contributions say in the ratio α, β where: $\alpha, \beta \leqslant 1$, then the relevance value of IA_5 would be computed as $(\alpha \cdot \theta_5 \cdot \phi_4 + \beta \cdot \theta_5 \cdot \phi_5)\Phi_2$.

When, in this case, $\alpha + \beta < 2$, the difference $(2 - (\alpha + \beta))$ may be distributed across other Project activities where appropriate.

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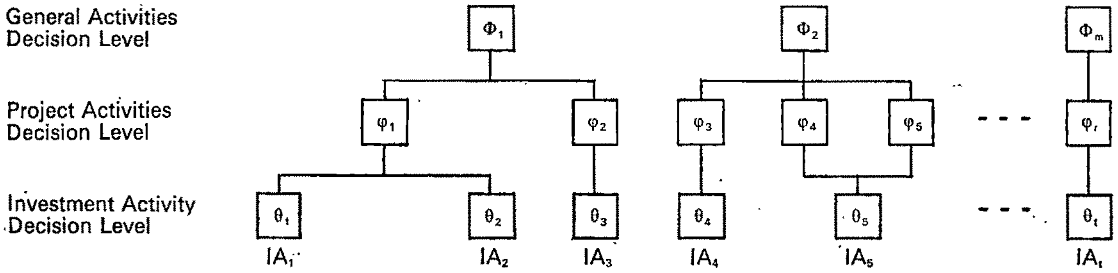
Figure A-2


General Activities Decision Level
Project Activities Decision Level
Investment Activity Decision Level
Φ1
Φ2
Φm
φ1
φ2
φ3
φ4
φ5
φr
θ1
θ2
θ3
θ4
θ5
θt
IA1
IA2
IA3
IA4
IA5
IAt

Relevance Values
Investment Activity:

$IA_1 = \theta_1 \cdot \varphi_1 \cdot \Phi_1$

$IA_2 = \theta_2 \cdot \varphi_1 \cdot \Phi_1$

$IA_3 = \theta_3 \cdot \varphi_2 \cdot \Phi_1$

$IA_4 = \theta_4 \cdot \varphi_3 \cdot \Phi_2$

$IA_5 = \theta_5 \cdot \varphi_4 \cdot \varphi_5 \cdot \Phi_2$

$IA_t = \theta_t \cdot \varphi_5 \cdot \theta_t$

Book Reviews

Accounting Research 1960–1970: A Critical Evaluation, edited by Nicholas Dopuch and Lawrence Revsine (Centre for International Education and Research in Accounting, University of Illinois, 1973)

A conference was held at the University of Illinois in April 1971 to undertake a critical review of accounting research in the nineteen-sixties; this volume is a record of the proceedings of that conference. It is noteworthy that, although the book is published (and presumably the conference was sponsored) by an 'International Centre', only four of the many hundred references in the papers are to non-North-American authors. Three of these are to works published in North America (by R. J. Chambers, J. M. Samuels and A. A. Walters) and the other is to Keynes's General Theory!

The volume contains four papers, each followed by the comments of two discussants and a very brief summary of the general discussion. Almost all the speakers protested about the way that accounting research had been divided for the purposes of the conference into four parts – management accounting research, behavioral accounting research, empirical research and '*a priori* research'. The last term appears to have been coined by the conference organisers and must, by residual, mean prescriptive works on financial accounting.

The general impression left by the conference is that accounting research has remarkably little solid achievement to show for a great deal of research effort especially in the nineteen-sixties. In financial accounting the complaint is that grand global models are too far removed from detailed problems of practice to have any impact, while in the other areas the position seems to be the opposite – researchers are working on very specific detailed projects while we still have no framework within which to fit them or by which to judge whether they are sensible.

The conference organisers may have helped this gloomy view to emerge by asking the main speakers to present papers on areas of research outside their own area of activity. At the start of his paper on empirical research Nils H. Hakansson introduces himself 'as one who has never done a formal empirical study in his life'. He sees empirical researchers in the sixties as 'with few exceptions' handling the data problem well and computing results 'without obvious flaws'. But he does not consider the appropriateness of the tests made. He asserts however that empirical research is premature, since we lack the appropriate models on which to base our empirical work. 'More would be learned from a few empirical studies based on a decent model than from a hundred empirical studies with the present relative emphasis on modeling'. Hakansson recommends that we devote a further five or ten years to the 'modeling phase'.

The discussants of this paper (George Benston and Nicholas Gonedes) both disagree with him fundamentally. They take the Friedman view that the realism of a model's assumptions is irrelevant and the validity of a model must be judged solely on its ability to predict. Subsequent discussion concentrated on this far from novel dispute. It was pointed out that all models leave out much of the real world, so that Hakansson's view requires a concept of unacceptable unreality. The discussants are therefore happy to press on with empirical research immediately; but unlike Hakansson they are far from happy with the results and methodology of the empirical studies carried out to date.

The paper by David Green on behavioral accounting consists of a review of the book of readings edited by Bruns and DeCoster 'Accounting and its Behavioral Implications'. He tries to define and classify behavioral accounting, and succeeds in defining out of the subject a number of the forty readings in Bruns and DeCoster. He sees little as having been achieved in this field and little prospect of anything better to come. He complains that in the papers in behavioural accounting research there is a lack of historical perspective, a lack of awareness and a lack of humility and wisdom (all surely common weaknesses of immaturity!). Speakers and discussants (William Bruns and Jacob Birnberg) agree that a necessary condition for progress is a partnership between an accountant and a behavioural scientist; they agree about little else.

The paper on research in management accounting by Robert Anthony is much less concerned with past achievements and much more with the future. Anthony sees usefulness as the major criterion for evaluating priorities for research effort; he emphasises that this means long-term potential for usefulness, not necessarily an immediately operational practical solution. But the discussants (Joel Demski and T. R. Dyckman) and the audience questioned whether this was itself an operational criterion or whether it merely drove one to search for a model of the information choice problem to which it seemed to be an alternative. Anthony puts his point in a less abstract way when he says that too much published research is on 'academically respectable' topics which are not those which are likely to be most fruitful in making improvements in areas of currently unsatisfactory practice. Anthony foresees that 'management accounting' will become a subset of 'information systems', necessitating more than lip service to behavioral considerations and a willingness to consider topics that are not amenable to neat economic model-building.

Carl Nelson has no prescriptions or forecasts for the future of financial accounting theory in his paper on '*a priori* Research'; instead he produces a most stimulating survey of the work of the nineteen-sixties. He considers the 'grand models' of Edwards and Bell, Chambers, Sprouse and Moonitz, Sterling and Sorter; he concludes that as these remain untested, and probably untestable, hypotheses, they do not solve our problems and 'it may be time to stop work on grand models in accounting'. He sees more interest in the less unified contributions of Ijiri as a tool-builder and of Bedford ('Income Determination Theory: An Accounting Framework') who looked at the applicability to accounting of ideas from the fields of information theory and probability concepts.

The discussants (Yuji Ijiri and Kermit Larson) do not contest Nelson's view of the situation. Ijiri points the way forward by asking for more emphasis on the contents of financial statements and less on valuation methods. He asks for a specification of goals and for the development of better measures of the qualities relevant to these goals.

It is salutary to be forced to think about our research activities as fundamentally as this conference report requires us to do. And there is hope that it may be a contribution towards reducing the quantity and raising the quality of published research in accounting.

Peter Bird

Financial Management in Local Government
Dr. A. H. Marshall (George Allen & Unwin. Hardback £6 – Paperback £3.25).

It is short odds that the majority of accountants glancing at the title of this book will dismiss the subject. At best they will regard it as a specialist sideline of no relevance to the main stream of financial management. Nevertheless there are three reasons why the subject of the book has a significance to a wider public than the aficionados of public financial administration.

Firstly, the size and growth rate of local government is now such that it can no longer be regarded as of specialist minority interest. It expends the equivalent of some 16% of the gross national product and employs over 2 million people and no one who has received a rate demand note this year can be unaware of its growth. Secondly, in the absence of the profit motive, development of financial administration has been concentrated upon the management process and upon internal techniques aimed at increasing objective criteria in decision taking. In this area there is much in common with the internal processes of large and medium sized private sector organisations. Thirdly, and most important of all, local government is now inseparably intertwined with the central government. For better or worse the relationships between the public and private sectors are, themselves, becoming ever more vital to each party and a true and fair view of financial administration in the public sector is now necessary to the all round accountant. Dr. Marshall's book provides an admirable basis for such a study.

The extent to which and the conditions under which financial administrators become involved in the management and democratic processes of a local authority is now a matter of lively debate. If the treasurers of the past could be criticised for overstressing the independence of finance, the directors of finance of the present and future are being reminded that the objectivity and integrity of financial administration cannot be compromised and that there is very much more to financial administration than the development of this year's model of the integrated management process. The theme throughout the book is one of finance being a part of the management process; interwoven with each element of management. The book will not therefore win the approval of those who regard the role of finance solely in terms of independent control of undisciplined forces and pressures which go to make up what is called a local authority.

For those among us who anticipate that the call for 'participation' in our organisations is unlikely to wither away, the experiences, strengths and weaknesses of local government are well worth studying. For, unlike Parliament or public boards, elected members of local authorities representing differing interests are directly responsible for the administration of a range of disparate functions and for making policy choices between those functions.

This book then, is of value to all who are concerned with contributing to better management without compromising professional objectivity and integrity in financial administration in a situation of conflicting pressures and interests. Being a book on finance, it would be a poor testimony to its message if the reader did not appraise the cost in relation to its value. The purchaser can buy the wisdom and experience of the writer in readable print for £3.25. It will cost him another £2.75 for stiff covers instead of floppy ones.

M. F. Stonefrost

Management: Tasks, Responsibilities, Practices
Peter F. Drucker (Heinemann) 1974. £6.00 839 +xvi pp.

You can see that this is a 'big book' by a 'big man'; it is also comparatively inexpensive at least on a per lb basis. This, one suspects, is because '... there are no equations in this book, no graphs, no mathematical formulas, not even a table' (p. x). That is to say (although one doubts if the author would agree) that it is not only a comparatively inexpensive piece of print work, but that necessarily it is essentially a philosophical treatise. Your reviewer does not judge it any the worse for that; as the author points out (at 506 ff) 'management science' tends to look for problems which can be solved by existing gimmicks, to the neglect of the relevance of the questions being resolved to the real interests of the enterprise, let alone those of humanity at large.

Certainly the author needs a large canvas, for he claims that we mostly live in societies in which every major social task is entrusted to large organisations and even that the strength of such corporations is our sole protection against Stalinist tyranny! He wants to show that there is a discipline or prospective discipline of management which is valid in all these organisations; also that it is independent of economics, quantification and behavioral science which are indeed merely its tools. Those of us who have read Professor Drucker's many earlier works may wonder how much of what he now says is strictly new (and he tells us in his preface some of the material is reproduced) but it is surely useful to have a sort of *Summa* from this distinguished writer on 'management topics'.

One suspects that a lot of people, especially younger people, would disagree with some of the propositions outlined above (although Professor Drucker looks very eager to take on all comers). For example, he sees bureaucracy as a 'degenerative disease of organisation' (p. 39) where management is seen as an end in itself. He seems unimpressed by Weber's idea of bureaucracy as something with rules and precedents which may not be fair or efficient but is certainly impartial and consistent – the very reverse of tyranny under Stalin or anyone else. More dangerously he sees progress and improvements as occurring solely through largish formal and autonomous institutions, with 'managers' to guide them; he sees continuing innovation and growth as both possible and necessary. 'Small is beautiful' has no charms for Peter F. Drucker and while he praises the Zen approach to education (p. 248) one must doubt whether the philosophy he expounds owes much to oriental mysticism. The author more than once impugns the sincerity of those who reject the pluralist society and all its works (e.g. p. ix).

Against this, one would be hard put to it to deny that the large autonomous institution is with us now and is not likely to be removed with any great speed in the near future. Professor Drucker is right to emphasise that these 'institutions' are by no means confined to 'business'; the largest growth areas in recent years have been in universities and social agencies of various sorts. The majority of us now work for such institutions and find ourselves in strange indeterminate roles very different from those of the entrepreneur and his subservient 'helpers'. He is equally right in pointing out that a large proportion of the population of developed countries now look to these institutions, rather than their central governments to solve the whole range of problems of the human condition, as well as produce its goods and services, education, sanitation and the like.

The book contains many other useful pieces of perception. For example that the manual worker really belongs to the past and knows it, hence his 'militancy' (p. 170); that budget-finance both within the company and in the public sector involves being 'all things to all men' and hence backing one horse while doing an expensive public relations job to convince interested parties that one is also backing all the others (p. 143)! That work has to be laid out uniformly but organised diversely (p. 184). However, on balance your reviewer feels that Professor Drucker fails to convince one of the truth of both his basic tenets – which is not to say that they are therefore untrue. He is very much aware that he is dealing with 'systems' and has something interesting to say about this in at least two places:

'The totality of "worker" and "working", the totality of task and job, perception and personality, work community, rewards and power relationships has received practically no attention. It may be far too complex ever to be truly understood' (p. 181).

'Systems organisation is an extension of the team design principle. But instead of individuals comprising a team, the systems organisation builds the team out of a wide variety of different organisations (p. 592) . . . it is fiendishly difficult' (p. 598).

Although Professor Drucker mentions with approval the work of Professor Jay Forrester (p. 507), he clearly approaches the system with extreme caution! It may be that this caution is justified but your reviewer was led to wonder whether the whole approach of this book was not groping after general systems science and even systems engineering. To be sure, socio-economic systems are very different from biological or electro/mechanical systems; they have indeed 'received practically no attention', but one *must* hope that they are not 'far too complex ever to be truly understood'. If 'the art of management' is ever formalised as a true discipline, it is likely to be recognised as socio-economic systems engineering.

A book doesn't have to resolve all the ills of mankind to be 'a good buy'. Is this one? Well, I doubt if it would help Bro. Weinstock make another million or so. Nevertheless, if you move in circles where people are prone to talk about things like 'general principles of management' (and you *don't* already possess the earlier opera – *The Age of Discontinuity*, *The Effective Executive*, *Managing for Results*, *The New Markets* . . ., *The Practice of Management*, *Technology*, *Management and Society*, *Landmarks of Tomorrow*, *The New Society*, *Big Business*, *The Future of Industrial Man* or *The End of Economic Man*) you would find yourself very well able to take your part in such rituals after reading it.

Trevor Gambling

European Company Law Texts Edited and Introduced by Professor Clive M. Schmitthoff (Stevens/Matthew Bender, x + 322 pp. £8).

This book, number 7 in the British Institute Studies in International and Comparative Law, is a useful, if somewhat expensive, compilation of English translations of the various measures of the European Community aimed at harmonisation of the company laws of the member states. It includes: The first Council Directive, implemented by section 9 of the European Communities Act 1972; the draft Directives on company formation and maintenance of capital, mergers, accounts, company structure and powers and obligations of company organs (the draft Fifth Directive which may compel us to introduce two-tier boards and worker representation), and prospectuses; the proposed Statute for the European Company; the 1968 Convention on mutual recognition of companies and the 1971 protocol on its interpretation; the draft Regulation on control of concentrations; and the draft Convention on international mergers. The texts are preceded by a short (50 page) explanatory introduction and summary by Professor Schmitthoff.

The British Institute of International and Comparative Law has rendered a valuable service by publishing in one volume the texts in English of measures to which English company lawyers and accountants will have to pay increasing attention in future.

L.C.B.G.

Contributors to Accounting and Business Research

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Ronald Ma was appointed to the Chair of Accountancy at the University of New South Wales in 1971, before which he was Senior Lecturer in Accounting at the Australian National University, and also taught at the University of Singapore and the University of Malaya. Prior to this he was engaged on the Finance of Public Companies project at the National Institute of Economic and Social Research in London. His main areas of research and teaching are in accounting theory and company finance. He holds the degree of BCom (London) and MBA (British Columbia) and is a Fellow of the Association of Certified Accountants. He is a co-author of the following books and monographs: *The National Income of Hong Kong* 1947–1950 (Hong Kong University Press, 1955); *The Economy of Malaysia and Singapore* (Malaysia Publications Ltd, 1966); and *A Study of the Public Sector Accounts of Singapore* (Economic Research Centre, University of Singapore, 1970). He has published articles in the following journals:

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